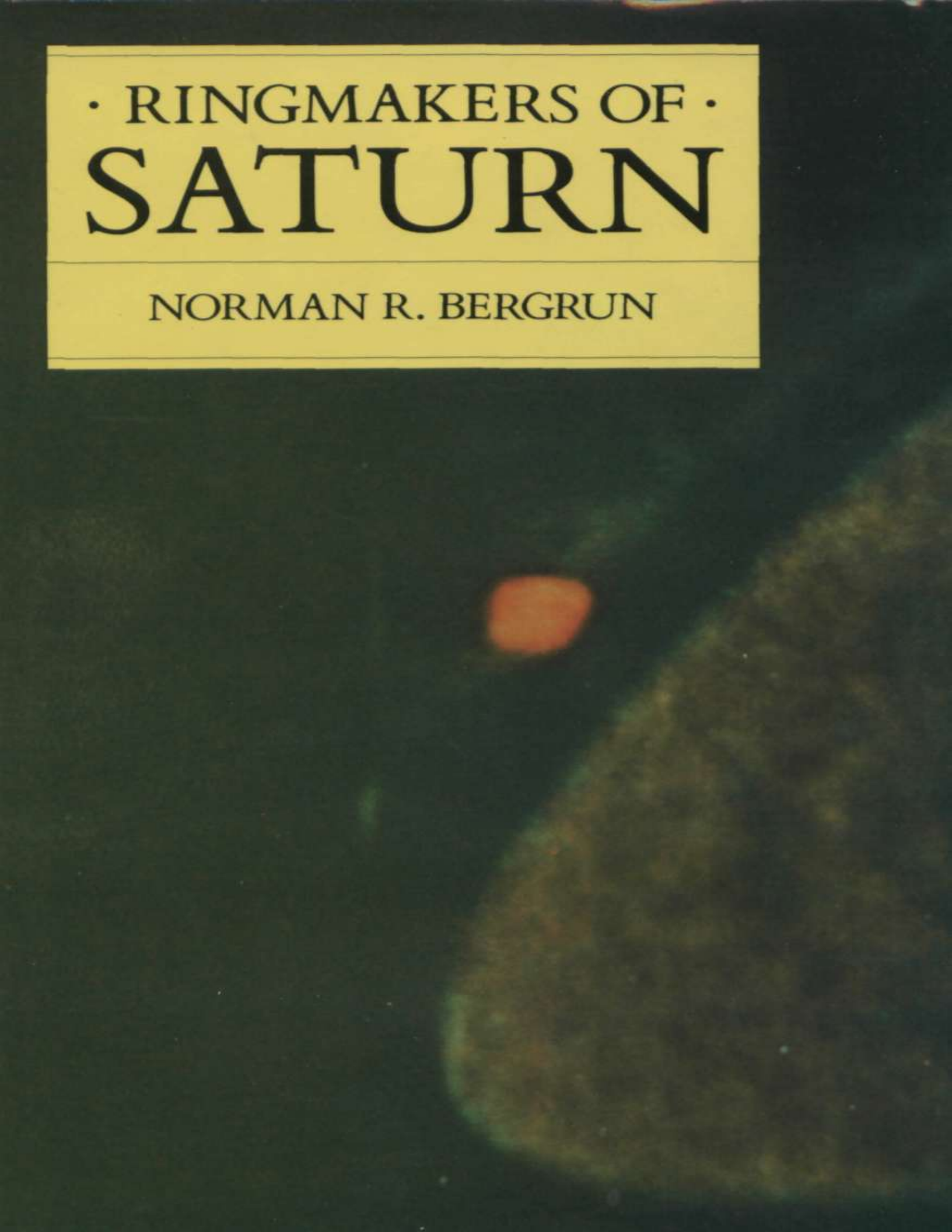
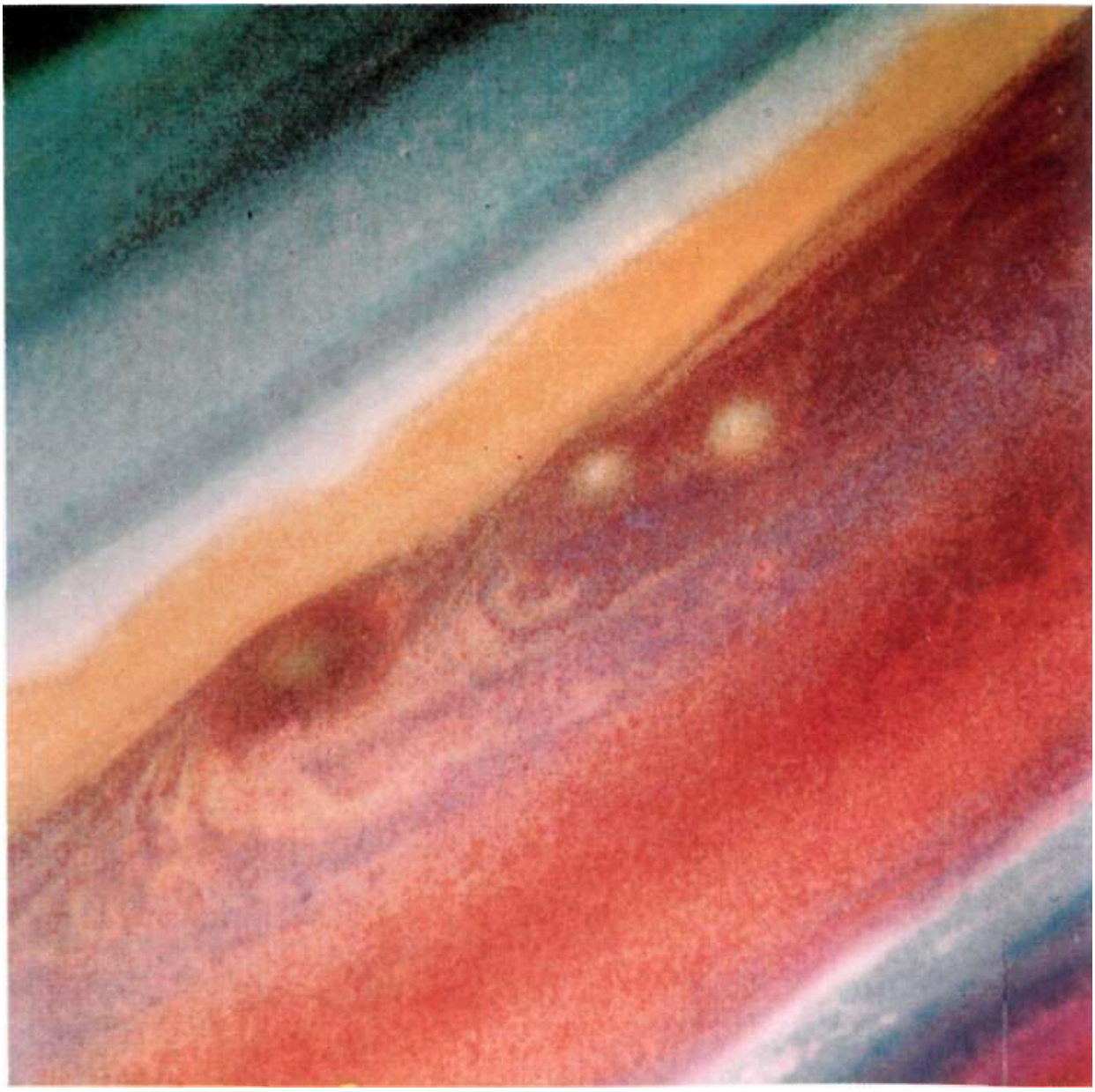
· RINGMAKERS OF ·
SATURN

NORMAN R. BERGRUN





Frontispiece: A spectacular pattern in Saturn's atmosphere masks the presence of awesome power.

NORMAN R. BERGRUN

Ringmakers of Saturn

The Pentland Press
Edinburgh

© Norman R. Bergrun 1986
All rights reserved
Excerpts may be made freely in furtherance
of knowledge and understanding
First published in 1986 by
The Pentland Press Ltd
Kippielaw by Haddington
East Lothian EH41 4PY
Scotland
Printed and bound in Scotland
by Clark Constable, Edinburgh and London
Jacket design by Ann Ross Paterson
Library of Congress Catalogue Card Number 86-81530
ISBN 0 946270 33 3

Dedicated
To All People
In Peaceful Quest of Knowledge

The Author

NORMAN BERGRUN

Executive. Personal: Born August 4, 1921; Son of Theodore and Naomi Ruth Stemm Bergrun (both deceased); Married Claire Michaelson; Father of Clark, Jay, Joan. Education: B.S.M.E., Cornell University, 1943; L.L.B., LaSalle University (Extension), 1955; Postgraduate Study, Stanford University, 1947; Continuing Education, Foothill College, 1982. Military: Served in the United States Navy, 1944-46, attaining the rank of Chief Specialist. Career: Executive, Bergrun Companies (Research, Engineering, Construction, Properties); Thermodynamicist, Douglas Aircraft Company, El Segundo, 1943-44; Aero Research Scientist, NACA Ames Laboratory, 1944-56; Lockheed Missile and Space Company, Van Nuys (CA), Supervisor Flight Test 1956-68, Manager Flight Test Analysis 1958-62, Manager Test Plans and Direction 1962-63, Manager Re-Entry Test Operations 1963-67, Staff Scientist Satellite Systems Applications 1967-69; Director, Management Information Systems, Nielsen Engineering and Research, Mt. View, California. Organizational Memberships: American Institute of Aeronautics and Astronautics, Chairman San Francisco Section 1962, Regional Director 1963, Associate Fellow; California Society of Professional Engineers, State Director 1973-74 and 1979-83, Vice-President, 1986. National Society of Professional Engineers, National Director, 1975-76; California Space and Defense Council, 1982; Co-founder and Acting Chairman of the Board, California Professional Engineering Center, 1986. Charter Member Aviation Hall of Fame. Community Activities: Foreign-Student Host, International Center for the Advancement of Management Education, Stanford University, 1964-67; National Hearing on Noise Abatement and Control, Washington, D.C., 1971; Steering Committee Member for Representative Charles S. Gubser, 10th District California, 83rd-93rd Congress, 1960-74; California Space and Defense Council, 1982; Presidential Task Force, 1982; Television Public Service Announcement, Holiday Project, 1981. Religion: Stanford Memorial Chapel, Teaching Assistant, Youth Program; Member Chapel Summer Choir, 1982; Foothill Evening Chorale, 1980-86 interdenominational. Honors and Awards: Engineer of the Year, California

Society of Professional Engineers, Penisula Chapter, 1978; Appreciation for Sustained Contributions Institute of Aeronautics and Astronautics, 1972; Extraordinary Service Award, National Management Association, 1968; Recognition of Distinctive Service, Institute of Aerospace Sciences, 1962; Appreciation for Contributions to First Polaris Launching, Navy Department, 1960.

From Second Edition
Two Thousand Notable Americans

Preface

Presented herein are pictures of immensely large, enormously powerful extraterrestrial space vehicles located in the vicinity of Saturn and its moons. These photographic revelations are reinforced by, and are consistent with, scientific data extending over centuries as far back as Galileo. The pictures have been obtained by the author using simple, repeatable enhancement techniques applied to publicly available NASA photographs from Voyager 1 and 2 flybys of Saturn. Having been obtained by pre-scheduled flight programming, Voyager photographs are scientifically unique in that they are strictly impersonal.

Identification of extraterrestrial vehicles, apparently possessing ancient historical presence in the solar system, is a new discovery having many ramifications. Attention, however, is focused on presenting factual information which can be gleaned from the pictures. Cameras, being wellestablished scientific instruments, provide direct data of the "Seeing-Is-Believing" variety. Despite their straight-forward characteristic, actual photographs probably will not establish conviction for everyone. For example, personal beliefs may deleteriously impair the communication process. Not withstanding this difficulty, effort has been exercised to enhance communication effectively through use of supplemental illustrations. Burdening detail of enhancement methodology, aerospace equations and technical jargon intentionally has been omitted to favor simple, broadly comprehensible language.

Considerable technical data have been published concerning Voyagers 1 and 2 on-board instrumentation results during the Saturn flybys. Interpretation of the visual data presented poses no conflict with data from other on-board instrumentation. In fact, all data are mutually compatible. Interestingly, the visual data stand on their own without the need for other measurements redundantly to attest to the accuracy of the analysis. A fundamental attribute of any correct analysis is that it supplies answers to a wide spectrum of relevant questions. When the physical nature of a problem is understood, a predictive ability then ensues which enables achievement

of new progress. Such achievement can be expressed simply as a breakthrough.

Magnitude of the Saturnian breakthrough would appear to be substantial. Saturnian space vehicles, strangely unusual in their great size and appearance, introduce a new and unpredictable variable into affairs world-wide. Some hitherto reported events are recounted in terms of vehicle capabilities with a view toward postulating some concept of what the future portends. Compelling reasons exist for obtaining a much more complete understanding of these vehicles and the inferential superlative intelligence behind them.

Photographic enhancement has been accomplished by enlarging negatives with a microscope having recording and high-intensity lighting capabilities. Self-developing positive film recorded the various selected images contained in negatives. Copies of original photomicrographic recordings are the product of professional film-processing services.

To recall, launch date for Voyager 1 is 5 September 1977 and for Voyager 2, 20 August 1977. Date of closest approach to Saturn is 12 November 1980 for Voyager 1 and 26 August 1981 for Voyager 2. Without photography from these flybys, the science story presented herein could not be told. Universality of interest in the findings renders disclosures singularly through disciplineoriented channels inappropriate. Further, absence of disciplinary-boundary constraints permits discussion of humanistic concerns relevant to the findings which otherwise would be omitted. This broad approach is expected to catalyze more readily and more realistically the priorities which should be given to the many, highly diverse, aspects of the subject matter.

Acknowledgments

NASA photographs are utilized from Voyager 1 and 2 flybys of Saturn and from Ranger and Orbiter lunar-mapping spacecraft. Appreciation is extended to NASA for releasing this information to the public that others might study it.

Appreciation also is extended to my wife and life-long friend, Claire Michaelson Bergrun, who supplied generous encouragement during all phases of producing this book.

To Dr. Walter Vincenti, Professor of Aeronautics and Astronautics at Stanford University, special thanks are given for his valuable suggestions at the final phase of the manuscript.

Clark Constable, noted for exceptional skills which have made it distinctive over the centuries, is particularly recognized for continued pursuit of excellence.

Acknowledgment also goes to Edinburgh's Meg Ross for her untiring reading and re-reading of the processed manuscript.

And finally, for his making everything come together speedily with gracious Scottish hospitality and manner, the author extends heart-felt gratitude to Douglas Law of Pentland Press.

Contents

Part I: IMPEDIMENTS TO PROGRESS
1. Puzzlements of Saturn
2. Acclimation to Huge Immensity

Part II: THE SATURN STRONGHOLD
3. Saturn's Rings Explained
4. Electromagnetic Vehicles
5. A Massive Display of Power
6. Luminoids
7. Vehicle Recognition

Part III: OUTLYING BASTIONS
8. Dione Gives Up a Big Secret
9. Iapetus Mystery Unraveled

Part IV: GLIMPSE OF A BIGGER PICTURE
10. The Lunar Connection
11. A Perspective

Part V: SYNTHESIS
12. The Status
13. Epilogue

Appendix
Bibliography
List of Plates

PART I

IMPEDIMENTS TO PROGRESS

CHAPTER 1

Puzzlements of Saturn

Saturn has beguiled observers since the dawn of recorded history over 50 centuries ago. In earliest history, Saturn has been associated with omens concerning both political and daily life. This situation changed little until the beginning of the 17th century when Galileo and his contemporaries, using telescopes, began systematic observations of Saturn.

Seventeenth century observers documented a variety of shapes for what are now known as Saturn's rings. Galileo himself pictured the "rings" as solid circles, one on either side of the planet. Others pictured a solid elliptical ring plane, but one containing unusual openings such as circles and diamond shapes. Absence of rings also is recorded. Variance among observers and the uncommon appearance of the rings have been attributed to poor telescope quality in early days.

Poor telescope quality also has been cited for the wide range in ringplane thickness documented by various observers later in the 18th century. Reported thicknesses range from 335 km (280 mi) to 16 km (10 mi). Whether Saturn had any rings at all continued to be questioned into the 19th century. In a carefully timed observation, a definitive shadow was expected to be cast on the ring plane by Saturn's moon, Titan; but no perceptible shadow ever occurred. The observer, W. R. Dawes, carefully concluded in 1862 that the rings must be inconceivably thin.

Near the end of the 18th century, luminous points were observed on the edge of the ring plane. One of these is reported to have moved off its position. None of the luminous points persisted very long (less than 16 hours), thereby negating the possibility of their being satellites. The observer, William Herschel, postulated in 1789 that some sort of unstable source must be responsible, such as an intense fire. Another puzzlement has been the sighting of one arm of the ring when the other arm could not be detected.

Luminous points continued to be reported by discriminating observers into the 19th century. Again, satellites of Saturn had to be ruled out as none could be located in the vicinity. The most astounding and now famous observations of a light source came in the 20th century on 9 February 1917. Two astronomers, Maurice Ainslie and John Knight of Great Britain, observed the source independently. Brightness of the source was so intense that Ainslie referred to the object as a "star". The star traveled a straight-line course which, in effect, subtended a chord across the ring system. Length of the chord was of the order of 125,000 km (77,700 mi). Observed time to traverse this chordal distance across the ring system was 1 hour and 40 minutes, making the average velocity 21 km/sec (13 mi/sec). This value compares with an average velocity for Voyager en route to Saturn of about 13.7 km/sec (8.5 mi/sec). That is, the star was about 1 1/2 times faster. During the observations when the star was in plain view, the light therefrom appeared to be elongated. There was a strange aspect about the traversal itself. Seeming to move through the ring plane without difficulty, the star appeared to devour material ahead as it proceeded. Further, at no time did the rings completely block out the radiating light.

Results from Voyager 1 have added new puzzlements. For example, so-called "spokes" of light stretch across part of the ring system; the F ring, which is positioned alone outside the main ring plane, contains entwined strands or "braids"; intense electrical discharges similar to, but much greater than, terrestrial lightning have been recorded; and Saturn's moon Iapetus is about 10 times, or one order* of magnitude, brighter on the sun-shadowed side than on the sun-exposed side.

**An estimate of magnitude expressed as a power of 10.*

Ring-plane thickness has been an exasperating frustration for almost 200 years. Voyager 1 did not shed any new light on the matter. Later, Voyager 2 added mystery to the existing enigma when, on 26 August 1981, instrumentation indicated the effective ring-plane thickness to be in the neighborhood of 1000 km (about 600 mi). This value is about twice those reported at the turn of the 18th century, and over an order of magnitude greater than measurements obtained during the onset of the 20th century. The problem is how to explain such a wide spread in measurements of the

same thing. Pressure mounts to recognize all ring-thickness values as being approximately correct at the time obtained. Such recognition, however, requires discarding a belief that 20th century telescopes could yield vastly better gross ringpattern definition than 18th century telescopes.

How is it possible for so many conscientious observer-analysts to encounter so many blocks to progress? Part of the answer to this question seems to be that preconceived ideas have been converted into fixed ideas. Then, when new data are received which do not conform to the fixed ideas, an impediment to progress is experienced. The reported variance in ring-plane thickness is a really good example. A preconceived idea which tacitly has become fixed is that ring thickness should be a constant, whereupon, variable thicknesses are intolerable. An impersonal method for dispensing with unwanted measurements has been to attribute variances plausibly to poor-quality telescopes. Notwithstanding the tendency to dispose of untoward data, another part of the answer to the question is that something in or about the data is being overlooked. Oversight unobtrusively is convenient when fixed ideas are being promulgated. However, oversight also can occur because of presumptive expectations that confirmative new findings will be obtained. Important facts have an uncanny tendency to remain obscure.

Correct explanations of Saturn's mysteries not only must be consistent with flyby observations, but also they must agree with the general thrust of findings by earlier observers. For example, 17th century observers indicate that Saturn's present annular-ring system has not always been so configured. On an absolute scale, 17th and 18th century telescopes admittedly were not sophisticated. However, recorded differences in ring-system configurations were made with nearly equally unsophisticated telescopes. Therefore, while minutiae
concerning ring shapes can be questioned, gross differences in form most likely are valid.

A valid explanation for ring configuration as seen by Voyager flybys should be capable also of encompassing 17th, 18th and 19th century observations. When a single causal mechanism explains several events, the correct explanation almost certainly has been found. Conversely, when a plurality

of mechanisms is required to explain several events, the correct explanation almost certainly has not been found. In the former instance, no coincidences are required. In the latter instance, unlikely coincidences are required. Existence of concurrent happenings, or a multiplicity of sequential happenings, only can be hypothesized. Introduction of coincidences into an analysis potentially is fraught with error.

Though the facts developed herein resemble science-fiction fantasy, impersonal photographs convey real-life non-fiction. Photographs and illustrations, coupled with their captions and labels, provide a skeletal framework of this scientific reference work. Pieces of the Saturn puzzle are presented in an ordered manner. Consequently, the reader is urged to proceed as though each chapter is a prerequisite to the subsequent one.

CHAPTER 2

Acclimation to Huge Immensity

Incredibly large and powerful objects exist in the universe. As a class, the largest and brightest single objects are star-like radio sources called quasars. An example is quasar 3C-273, estimated to be about a lightyear* across and to produce energy equivalent to about 10 trillion suns. This object is located so remotely that its signals, traveling at the speed of light, require about 30 million centuries to reach earth. Indeed, the universe is a place in which huge immensity abounds. Memory of this characteristic is essential when shifting thought from familiar terrestrial physical sizes to unfamiliar, extraterrestrial ones.

**Distance traveled by a particle moving at the speed of light for a year.*

Being only about 1/1000 light-year across the outermost planetary orbit, our solar system is small compared with the size of quasar 3C-273. Yet spatially, the solar system is quite immense. For example, the distance between the sun and its outermost planet Pluto is 3.7 billion miles. Sunlight requires about 5 1/2 hours to journey there; and a spacecraft traveling at only 34,000 miles per hour would require 1 1/4 decades to make the same trip. In the solar system, 9 planets orbit the sun. These bodies are enumerated in Table I to illustrate comparative size and position.

TABLE I: Comparative Size and Position of Planets in the Solar System

Solar System Region	*Orbital Position Outward from the Sun*	*Name of Body*	*Diameter in 1000's of kilometers (km)*	*Distance from Sun, Astronomical Units† (AU)*	*Time for Sunlight to Reach Planet, Hours*	*Size Compared with Sun, Percent*
Center	0	Sun	1392.00	0	0	100.00
Inner Planets	1	Mercury	4.84	0.39	0.05	0.35
	2	Venus	12.14	0.72	0.10	0.87
	3	Earth	12.76	1.00	0.14	0.92
	4	Mars	6.82	1.52	0.21	0.49
Outer Planets	5	Jupiter	140.00	5.20	0.72	10.06
	6	Saturn	120.66	9.55	1.32	8.67
	7	Uranus	51.00	19.20	2.66	3.66
	8	Neptune	50.00	30.10	4.17	3.59
	9	Pluto	5.80	39.50	5.47	0.42

†Mean distance between sun and earth, a length of 149.5 million kilometers (92.9 million miles).

In Table I, Mercury, Venus, Earth and Mars comprise the innerplanet group which orbits nearest the sun. Jupiter, Saturn, Uranus, Neptune and Pluto constitute the outer-planet group. An asteroid belt, not included in the table, lies between the Mars-Jupiter orbits and serves to mark separation between the two groups. Diameters of all the inner planets are less than one percent that of the sun. Earth slightly out-ranks Venus in size with a diameter of nearly 1/100 (0.92 percent) that of the sun. Except for Pluto, all planets in the outer groups have diameters greater than 3.6 percent of the sun's. Of all planets, Jupiter is the largest with a diameter slightly exceeding 1/10(10.1 percent) that of the sun. Saturn is second largest with a fractional comparative diameter of 1/11 (8.7 percent). An appreciation of the relative spacing of the planets with respect to the sun can be obtained by noting time for sunlight to be received. Inner planets receive light from the sun ranging from only 3 to 13 minutes (0.05 to 0.21 hours). In contrast, outer planets receive light ranging from about 3/4 to 5 1/2 hours. As between Earth and Saturn, the time differential for a light signal is almost 1 1/4 (1.32 minus 0.14) hours. This time corresponds to the shortest orbital distance between the two planets of 8.55 (9.55 minus 1.00) astronomical units, or 794.3 million miles.

By earth standards, the approximate 800 million miles to Saturn is an immensely large distance. Voyager 1 traversed approximately this distance and took over 3 years and 2 months to do so. Voyager 2 on its journey to Saturn traversed about 1.4 billion miles, a journey requiring slightly more than 4 years. Historically, these accomplishments are superb. However, limited speed and load-carrying capability of 20th century spacecraft preclude extensive excursions in or beyond the solar system. Significant improvement in this restricted ability to travel extraterrestrially awaits the application of nuclear power to space flight-propulsion systems.

Technological limitation is not the only impediment to space exploration. There is also the problem of sustained economic support for long, expensive space flights. These severe restrictions suggest strongly that more should be expected from space flight than extensive data generation. Data analyses are the key. Analyses must be directed toward pin-pointing, in a timely manner, specific worthwhile objectives for succeeding flights. A long wait, say 10 years, before data from a flight are digested comprehensively, does not permit plans for subsequent flights to benefit very much from prior experience. Apropos, six years after launch, Voyager flights returned no compelling reasons for undertaking further flights to Saturn or to any other part of the solar system.

The purpose of this treatise is to demonstrate that compelling reasons indeed do exist for urgent further exploration of Saturn and environs. Therefore, let us focus now on the Saturnian complex and concentrate attention there.

Since the Galilean period nearly 400 years ago, Saturn's most notable feature has been its rings. These rings span 22 earth diameters and extend on either side of the planet an equivalent of 1.13 Saturn diameters. Sufficient consistency in plan-form of the ring plane has been displayed over time such that designations could be assigned to various regions. Starting from the outer edge of the ring plane and progressing inward, four rings have been designated: A, B, C and D. A narrow separation occurs in the outer extremity of the A ring called the Enke* division, after the discoverer Johann Enke.

**Also called by some authors the Keeler division or gap, for American astronomer, James E. Keeler.*

The A and B rings are considered non-contiguous, being separated by a space called the Cassini division after the Italian-born French astronomer. The inner edge of the B ring also constitutes the outer edge of the C ring. The D ring fills a space from 1.1 Saturn radii to the inner edge of the C ring, a ring having a so-called "crepe" texture. Additional radial designations are not consecutive, owing to the chronological order of discovery. For example, before Voyager 1, a faint ring located between about 3 and 8 Saturn radii had been assigned the next alphabetical designation, E. Then Voyager 1 found two rings between the A and E rings. These latter two rings have been designated F and G, with the F ring being innermost.

Photographic imagery from Voyager 1 has credited Saturn with 15 satellites, or moons. Voyager 2 added several more. Of the entire total, only 8 are spherical bodies, the remainder all being irregularly shaped. Enumerated in progressively outward orbital locations from Saturn, the spherical satellites are: Mimas, Enceladus, Tethys, Dione, Rhea, Titan, Iapetus and Phoebe. The first four, Mimas, Enceladus, Tethys and Dione, lie within the radial expanse of the E ring. Rhea, at 8.7 Saturn radii, orbits closely outside the E-ring outer edge (8.0 Saturn radii). Titan, Iapetus and Phoebe are quite remote, being at about 20, 59 and 215 Saturn radii, respectively. Practically all irregularly-shaped satellites occupy the zone between the A and G rings. Two of these, 1980S27 and 1980S28, are unique in that they orbit tightly astraddle the F ring. This particular pair has been designated "shepherding" satellites.

Saturn's rings and spherical satellites are summarized pictorially in Plate 1, parts (a) and (b). Part (a) shows the relative spacing of the rings with their classical nomenclature. Part (b) shows spherical satellites in their relative orbital spacing.

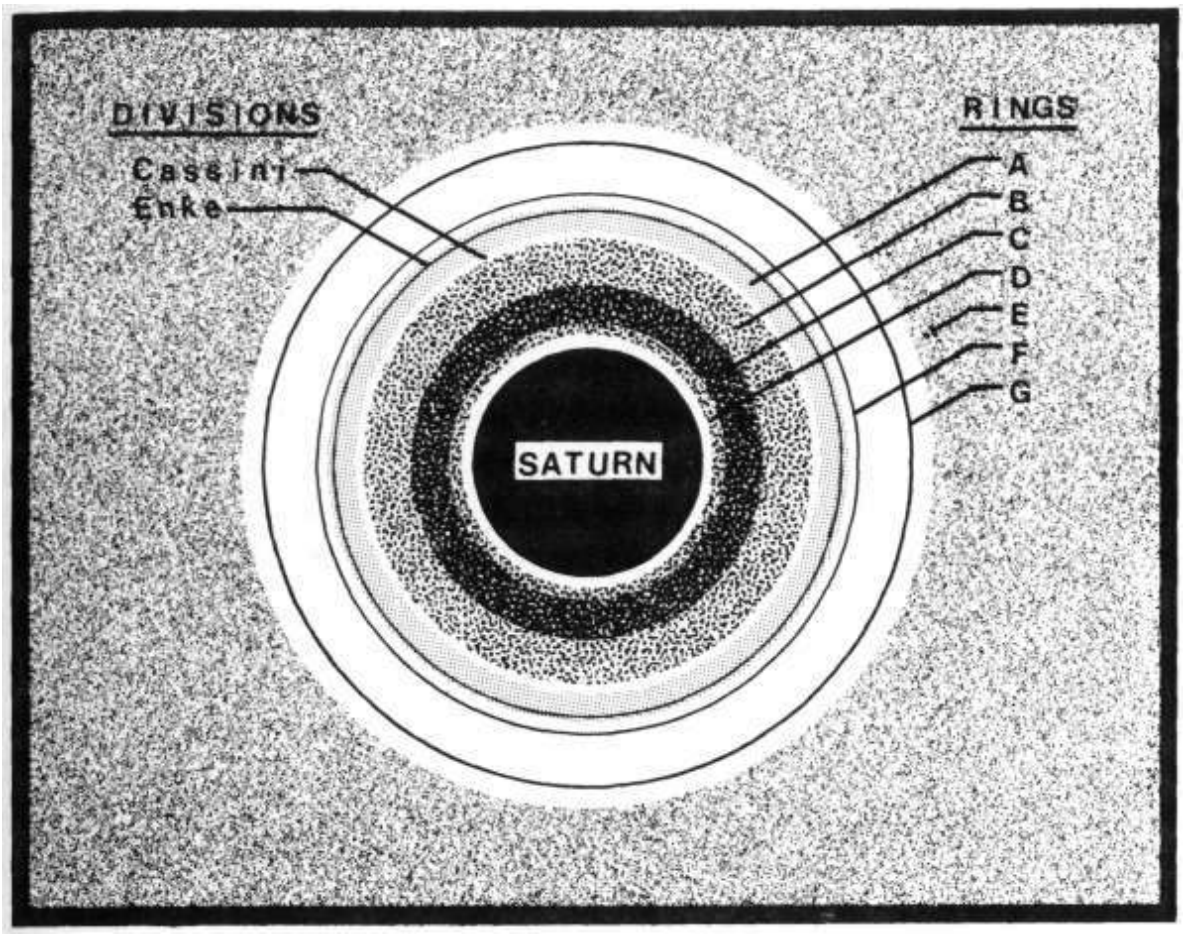
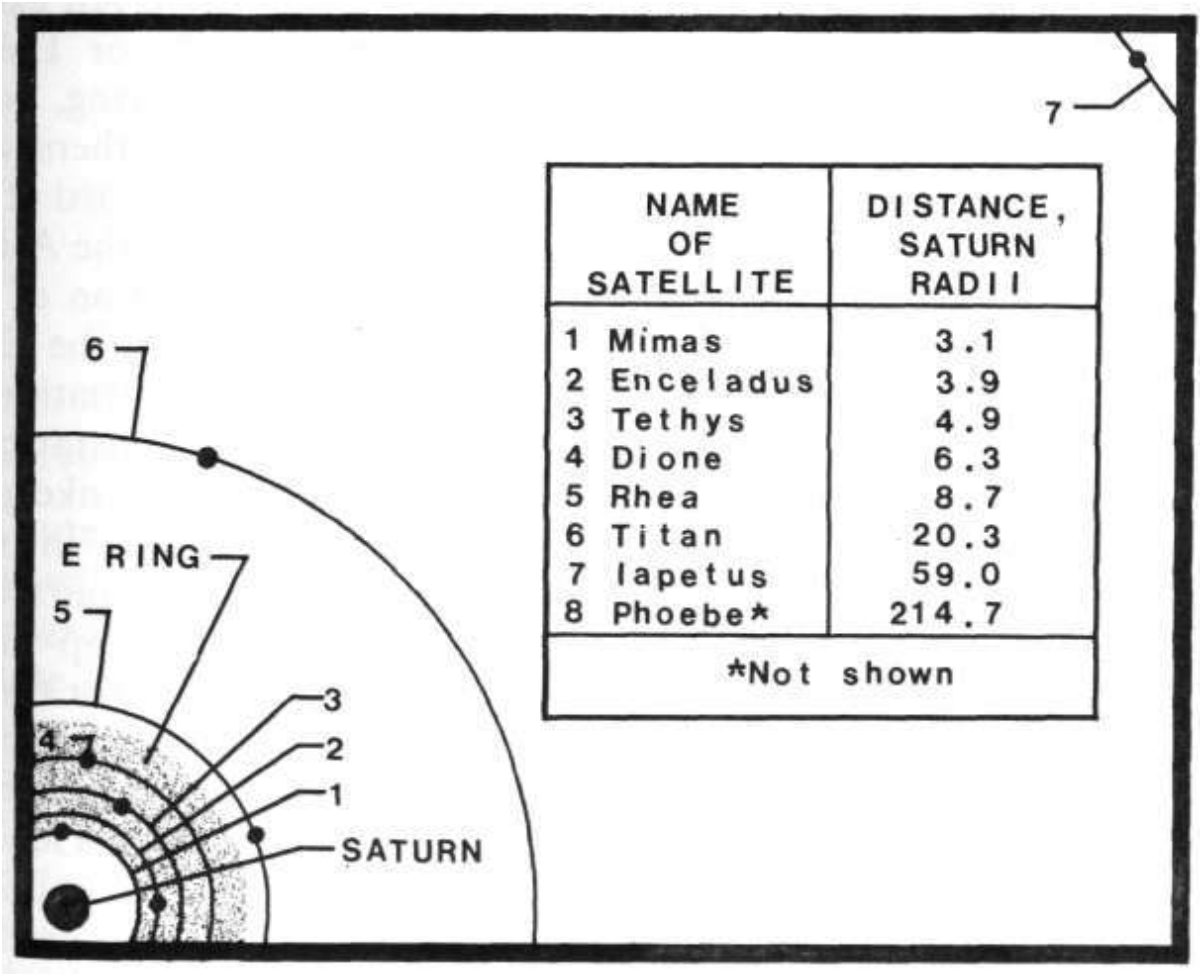


***Plate 1**: Rings and Spherical Satellites of Saturn. Radius of Saturn is 60,330 km (37,490 mi).*
(a) Rings



NAME OF SATELLITE	DISTANCE, SATURN RADII
1 Mimas	3.1
2 Enceladus	3.9
3 Tethys	4.9
4 Dione	6.3
5 Rhea	8.7
6 Titan	20.3
7 Iapetus	59.0
8 Phoebe*	214.7
*Not shown	

(b) Spherical Satellites

Mimas, Enceladus, Tethys, Dione, Rhea and E ring are close to Saturn compared with the outer satellites Titan, Iapetus and Phoebe. Considering the Saturn-system boundary defined by the orbit of the outermost satellite Phoebe, the system diameter is 26 million km (16 million mi). Also equivalent to 0.17 astronomical units, the system span measures about half the distance between the Sun and the innermost planet Mercury (0.39 AU).

Saturn is an order of magnitude larger than Earth. Yet Saturn is regarded with wonder and astonishment, not because of its large size, but because of perplexity aroused over its dramatic rings. A widely held, popular view is that ring divisions are always located in the same place. This mythical view persists despite observational reports indicating significant variability in ring-division location. An exemplary case in point is the Enke division. After Professor Enke's announcement concerning discovery of a gap in the A ring,

some observers could not find the alleged separation at all. Others who succeeded reported the gap located at various distances inboard of the A-ring outer edge. Distance of the Enke gap inboard from the A-ring outer edge can be expressed non-dimensionally as a fraction of the entire A-ring radial width. Fractional-distance locations of the Enke gap inboard of the A-ring outer edge show appreciable variation as follows: 0, 1/4, 1/3, 2/5 and 1/2. According to these data, constancy of location within the A ring definitely is not an attribute of the Enke gap.

There have also been indications of other variations in ring geometry. Different ring-plane thickness values have been reported as well as different values for width of the Cassini gap. Cassini gap-width variation, as much as 33 percent, reflects time-variant radii for the firing outer edge and the A-ring inner edge. An impression is conveyed that latest reported measurements purport to be the true ones when, in reality, all might be quite nearly correct at time of observation. General reluctance to accept variable ring-system geometry occurs because of apparent failure to identify a physical mechanism suitable for producing recurrent change.

Presented in Plate 2 is a photograph of Saturn exhibiting circularly complete rings. The elliptical appearance of the rings is due to the angle at which the ring plane is viewed. Near the ends of the major axis of the ring ellipse, the Enke division can be identified by a short, dark arc. By scaling the photograph along the ring major axis, the Enke division is found located a fractional distance of 1/5 the A-ring width from the ring outer edge. This value is at the low end of the historical range of reported values.

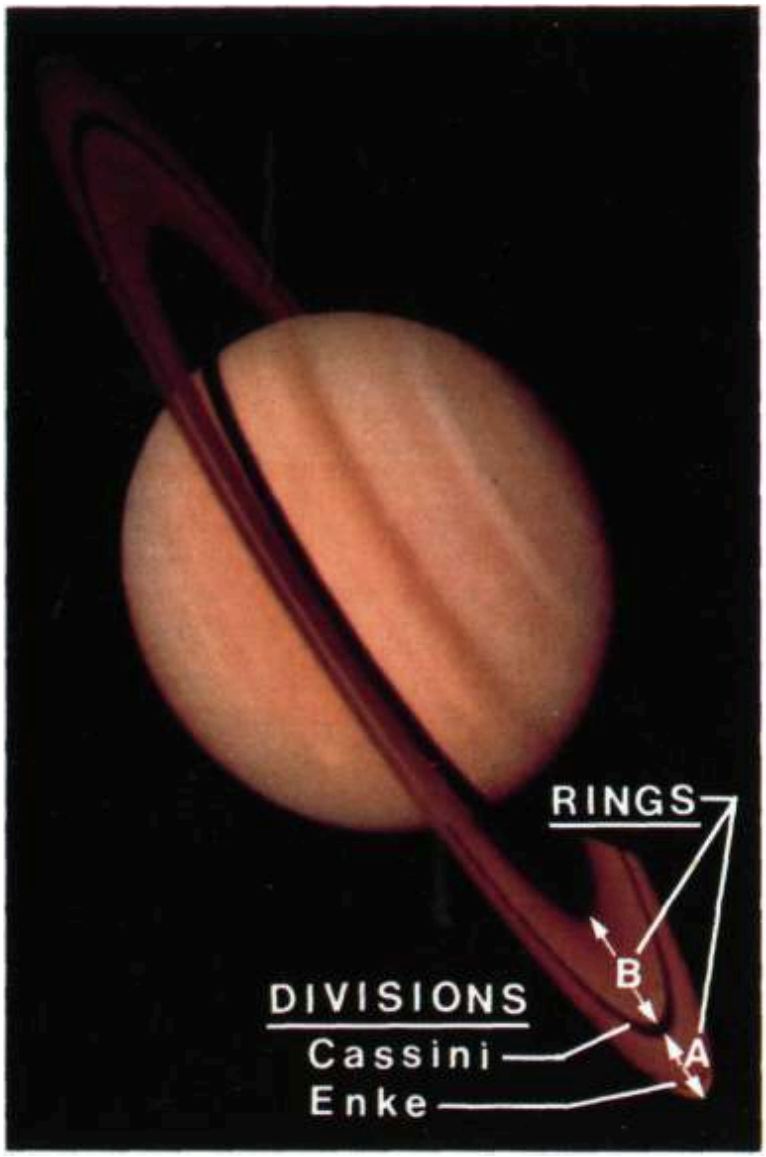


Plate 2*: Saturn, second largest planet in the solar system, exhibiting circularly complete rings.*

Separation of the A and B rings by the Cassini division also is evident in Plate 2. This division shows as a clear space across the face of Saturn, then as a dark and broad continuous arc throughout the remainder of the ring. Ratio of the A-ring breadth to the B-ring breadth scales 3 to 5. On the same scale, Saturn is 21.6 units in diameter. For an equatorial diameter of Saturn equal to 120,660 km, apparent width of the A and B rings is about 16,750 km (10,400 mi) and 27,930 km (17,350 mi), respectively. Distance of the Enke division from the A-ring outer edge is calculated to be 3350 km (2080 mi). Obviously, large distances photographically are compressed into an

exceedingly small space. The A ring illustrates well this high degree of compression. Width of the A ring is equivalent to about an 18-hour non-stop jet flight between Montreal, Canada and Melbourne, Australia. Yet in the photograph, this great distance is represented by only 6/10 cm (1/4 inch). Mental cognizance and retention of this high-compression characteristic during examination of subsequent photographs is helpful to their comprehension.

PART II

THE SATURN STRONGHOLD

CHAPTER 3

Saturn's Rings Explained

Luminous sources at Saturn have been observed, notably by Herschel, Knight and Ainslie. In one instance, a fiery source moved suddenly away from the A-ring outer edge. In another unrelated instance a bright, elongated source pursuing a straight-line course entered the A-ring outer edge, traversed the Cassini division, and exited the opposite A-ring outer edge. After these dramatic events, luminous sources did not become a specific subject of inquiry as might be expected - that is, until this analysis many years later.

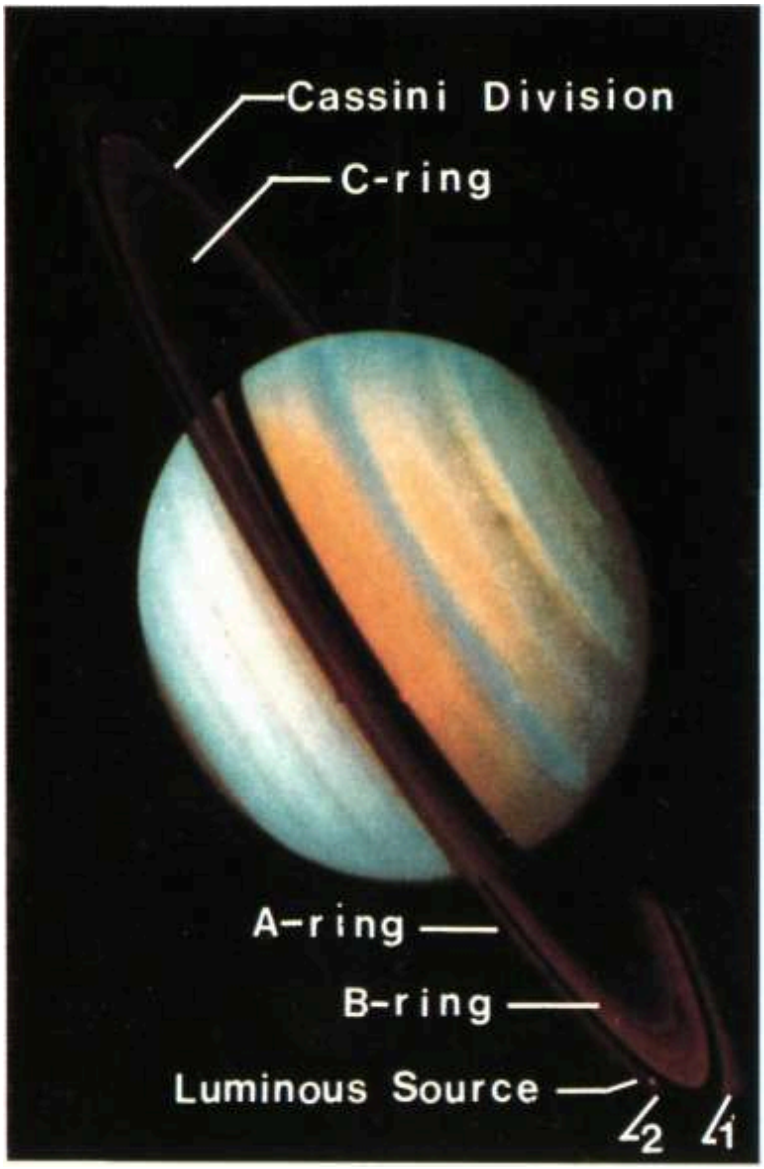


***Plate 3**: A luminous source appears in the A-ring of Saturn.*

A number of luminous sources appear in Voyager imagery. One of these sources, located in the A ring, is documented in the photograph of Plate 3. A pointer locates this source which appears as a small reddish-orange spot. In the picture, the A and B rings readily can be identified; and even some of the faint C ring can be distinguished. The Cassini division, pointed to in the upper left corner of the picture, clearly is formed by a separation between the A and B rings. Diagonally in the opposite corner below the luminous source, a comparably formed Cassini division is absent. The B-ring outer edge is complete. However, between points (1) and (2), the A ring is nowhere to be seen. A segment of the A ring appears strangely terminated across a chord of

the entire ring system. Absence of this ring segment is addressed subsequently.

Because of the shallow view angle of Saturn's rings in Plate 3, the distance between points (1) and (2) appears very highly compressed. As a result, the immense length of the ring-segment chord is not readily comprehensible. To aid comprehension, Plate 4 conceptualizes the incomplete A ring in a polar view of Saturn's northern hemisphere.

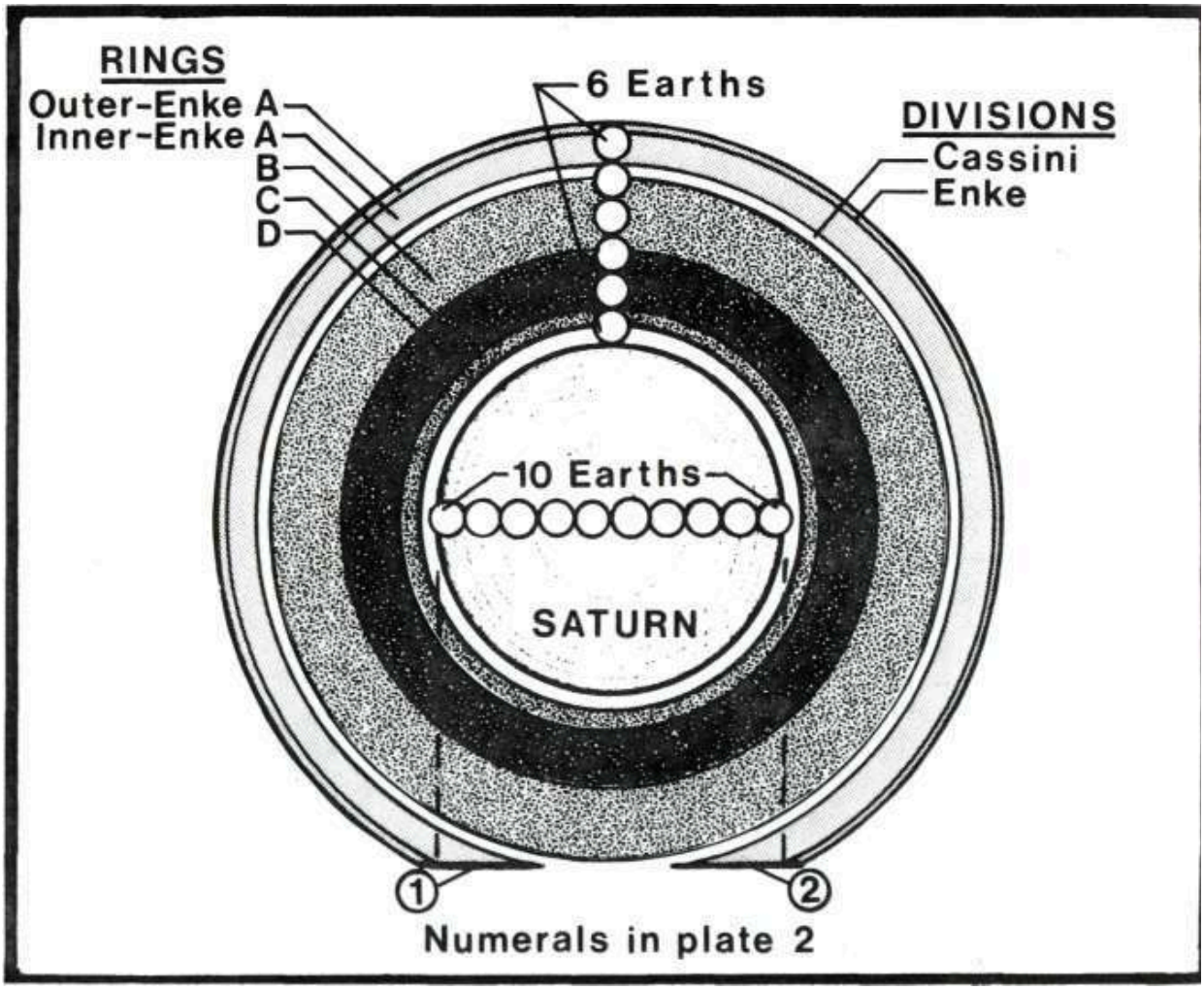


Plate 4*: Conceptualization of the incomplete A-ring in a polar view of Saturn's northern hemisphere, using Earth as a comparable reference measure.*

Earth profiles are introduced to provide a familiar reference measure. Line-of-sight is perpendicular to the ring plane so that all rings appear in true

relative proportion. The length of the ring-segment chord is greater than Saturn's diameter. This fact is illustrated by projection of parallel dotted lines from Saturn to the chord. These dotted lines intersect the ring chord within the cut-off segment of the A ring. The Enke division, placed at 2/5 the A-ring width from the outer edge, can be seen to intersect the chord at nearly the same points as the projected dotted lines. The distance subtended by the entire chord is equivalent to slightly over 10 earth diameters. Only about 6 earth diameters comprise the radial distance from Saturn's surface to the A-ring outer edge. Other distances also can be compared. For example, the radial span from the inner edge of the A ring to the outer edge of the Enke division is about one earth diameter. Span of the Enke division is expressed by a mere line width inasmuch as this gap is only about 200 km (125 mi) across. Radial span of the Cassini division is about 0.3 earth diameter. As before, Saturn's diameter is 120,660 km (74,980 mi). Circled numerals cross-reference the corresponding numerals shown in Plate 3.

When the photograph of Plate 3 is enlarged in the vicinity of numeral (1), the information of Plate 5 is obtained. In Plate 5, efflux from along the length of a slender body exhausting at both ends generates the A ring. The luminous source seen near numeral (2) in Plate 3 appears at the left edge.

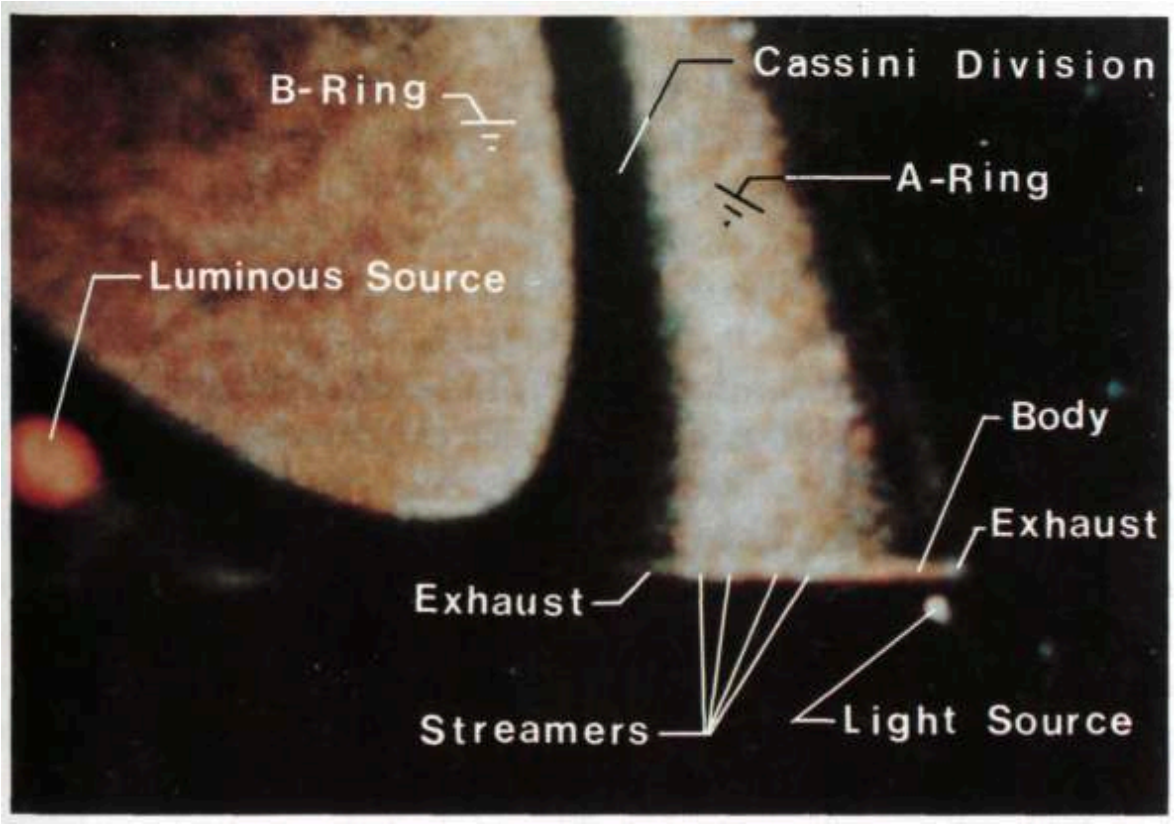


***Plate 5**: Efflux from along the length of a slender body, exhausting at both ends, generates the A-ring.*

Inspection of Plate 5 indicates that a slender body is orbiting clockwise and, in doing so, deposits a wide trail. This trail, which can be recognized as the A ring without the Enke division, is generated by efflux emanating from nearly the entire length of the body. While most of the efflux is generated along the top, some also appears to begin underneath and along the body sides in the form of streamers. These streamers pass over the side toward the right, proceed above the body and contribute to the A-ring trail. Presence of exhaust flames from each end of the body and the bulgy appearance of the streamers as they pass over the body suggest a circular cross-section for the body. A light source, somewhat greater in diameter than the body, is positioned below the right end. This source is attached to the body with inter-connecting emissions turning to an orange-red arc along the top edge.

Emissions from the body can be viewed collectively as creating a net force on the unit. According to one of Isaac Newton's laws of motion, forces can occur only in action-reaction pairs. The reaction of the body to the action of

the emissions is to move the body, presumably in a direction so as to complete the ring. This physically inherent mobile capability is justification for calling the body a vehicle*. The ratio of apparent body length to thickness, called apparent fineness ratio, is about 13 to 1.

*See Appendix.

Absolute dimensions corresponding to fineness ratio 13 can be estimated. Consider that the vehicle lies along the chord identified by numeral (1) in Plate 4, and that the vehicle extends from the A-ring inner edge to the Enke-division inner edge. By scaling the illustration in Plate 4, the body length is found to be about 0.3 Saturn diameter, or about 36,200 km (22,500 mi). This length corresponds to about 3 earth diameters. Based on a 13 to 1 fineness ratio, the body diameter can be deduced to be 2785 km (1730 mi). This distance is about the same as the airline distance from San Francisco, California to St. Louis, Missouri on the Mississippi River. Such an immense propulsive body implies a space engine possessing unheard-of capacity and capability.

When the photograph of Plate 3 is enlarged in the vicinity of numeral (2), the information of Plate 6 is obtained. In Plate 6, a second slender vehicle forms an A-ring trail which includes a luminous source. This source is the same one identified in Plates 3 and 5. Breadth of the source is estimated to be about half the distance between the A-ring inner edge and the Enke-division inner edge. This sizing places the breadth of the luminous source at about 5600 km (3480 mi). This distance is slightly over 1 1/2 times the diameter of earth's moon and about the same as the airline distance between New York and London. The large magnitude attests to the vast energy powering the engine of the slender space vehicle.

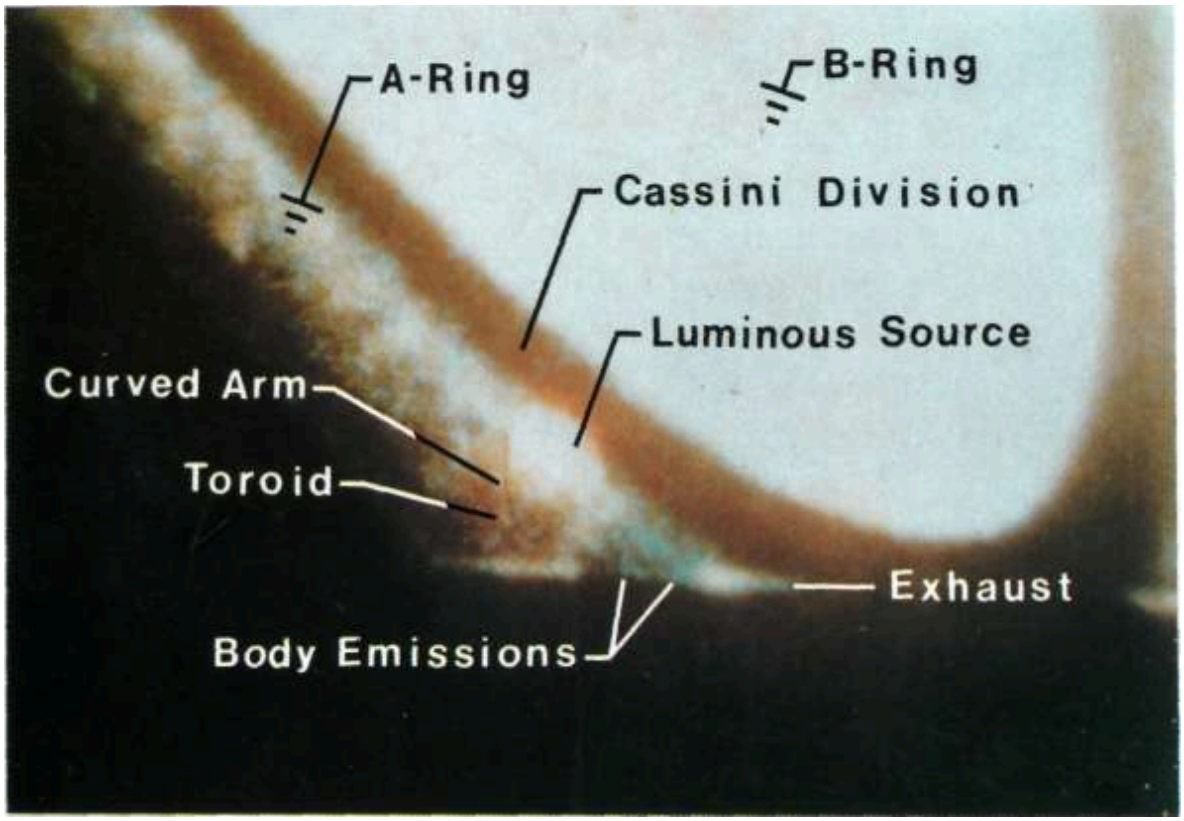


***Plate 6**: A slender vehicle forms an A-ring trail which includes a luminous source.*

Projecting from beneath the luminous source in Plate 6 is a wire-like arm which curves upward into the foreground toward the left. At about 1/3 of its length from the bottom, the arm has a bulge in it. This bulge appears to be a doughnut-shaped formation, or toroid through which the arm passes. Presence of a toroid indicates that the arm is acting as a conductor carrying electricity. Such an indication is given because physically a circular conductor of electricity has, in cross section, magnetic-field lines consisting of concentric circles (i.e., circles
with a common center). Magnetizable matter caught in such a field will align itself concentrically with the conductor and collectively assume a toroidal shape. Diameter of the conductor is in the neighborhood of 350 km (220 mi). Length is of the order of 4000 km (2500 mi). Without this arm, maintenance of the luminous source probably would be impossible.

Scaling the vehicle in Plate 6 yields an apparent fineness ratio of about 13 to 1, the same as for its companion vehicle in Plate 5. Orientation of the trails

from both vehicles suggests that the two are moving toward one another, apparently on a collision course. A collision would not occur, of course, were the vehicles in different planes or were one to surrender its position to the other. Preference is for the latter. Excluding bulb luminous sources, Plates 5 and 6 tend to show that vehicle diameter is an approximate measure of thickness of the A ring at inception. For the time frame shown then, maximum ring thickness inferentially would be of the order of 2785 km (1730 mi). Obviously, at large distances from the vehicle, at the ring edges and for old trails, the ring would be expected to be much thinner and more diffuse.

Plates 3, 5 and 6 confirm the early observations of moving luminous sources by Herschel, Knight and Ainslie. Herschel is credited with a source of variable luminosity, possibly of a fiery character. Knight and Ainslie reported a luminous source as bright as a star. Both descriptions fit acceptably well that which is discerned from the three plates. An additional commonality exists between the Knight-Ainslie event and the two vehicles in Plates 5 and 6. Specifically, the chordal path of the Knight-Ainslie moving source is the same chordal element defined by the location and orientation of the two vehicles. Whether these chords are in the same approximate position around the ring is beyond the scope of this inquiry.

Plates 5 and 6 reveal that width of the Cassini division occurs neither accidentally nor with exact repeatability. The reason is that the basic spacing depends upon the radius at which a mobile vehicle orbits with respect to the B ring. Even though this orbital radius might be constant, a substantial degree of variability in character of the trailing flux can alter the radial location of the inner edge of the A ring. Also, the extent of flux emission along the length of a vehicle can influence the width of the Cassini division. These possibilities for differences explain the variability in measurements by different observers over the years. Fairly narrow tolerances, astronomically speaking, on the radius of the B-ring outer edge and the A-ring inner edge have led observers to conclude that the Cassini division is a true gap. That the Enke division is a true gap has been doubted because of its apparent absence from time to time. Actually, the Enke division is formed in the same manner as the Cassini division and in this sense, the Enke gap is just as true a one as the Cassini gap.

Plate 7 shows formation of the Enke division. In the plate, the A and B rings as well as the Cassini division can be recognized. Once again, a vehicle is found depositing an orbital trail. Efflux emanating primarily from the radially outboard 2/3 of body length is responsible.

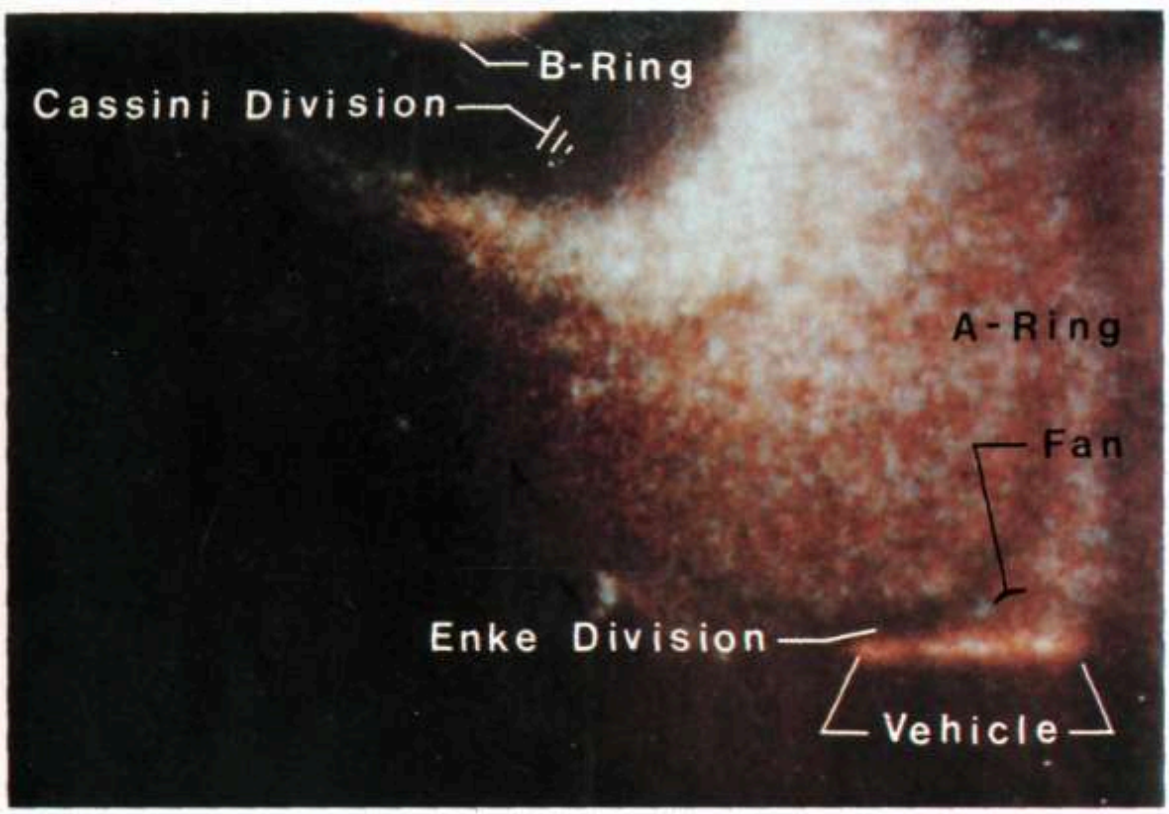


***Plate** 7: Formation of the Enke division.*

Clearly, were the vehicle located at a slightly shorter radius, the gap would be lessened. Widths reported for the Enke division range from approximately 200 to 320 km (125 to 200 mi). Nominally, this gap width is equivalent to a variation in orbital radius of only about 1/4 of one percent. The implication is that orbital radius of vehicle position is set very precisely in order to have a gap produced. Inspection of the vehicle reveals numerous jets issuing from many different positions around and along the body. A fan of three jets appears to form the inboard part of the trailing efflux. Each jet appears to consist of a series of bulbous swellings. Such swellings are indicative of the form of electricially charged flows known as pinched plasmas. Length of the vehicle appears to be about 10 times its diameter. A dark jet crossing the body near the left end makes the vehicle appear as though there are two

sections aligned longitudinally. In reality, the vehicle is integrally one. An attempt at sizing yields an apparent length of about 4700 km (2900 mi) and a diameter of 470 km (290 mi). Diameters of issuing jets are of the order of 0.1 to 0.2 body diameter, or about 47 to 94 km (29 to 58 mi).

Numerous photographs have been examined with special attention being given to the outermost region of Saturn's A ring. The search produced another vehicle at the outer edge of the Enke gap. This second vehicle, shown in Plate 8, substantiates the process by which the outer A ring and the Enke division are formed. In the plate, the Cassini division, the entire breadth of the A ring and the Enke division can be discerned. The outer annulus of the A ring, defined by the Enke division and the A-ring outer edge, again is found to consist of a trail deposited by a slender vehicle. As before, efflux emitted from around and along the body is the source of the trail.

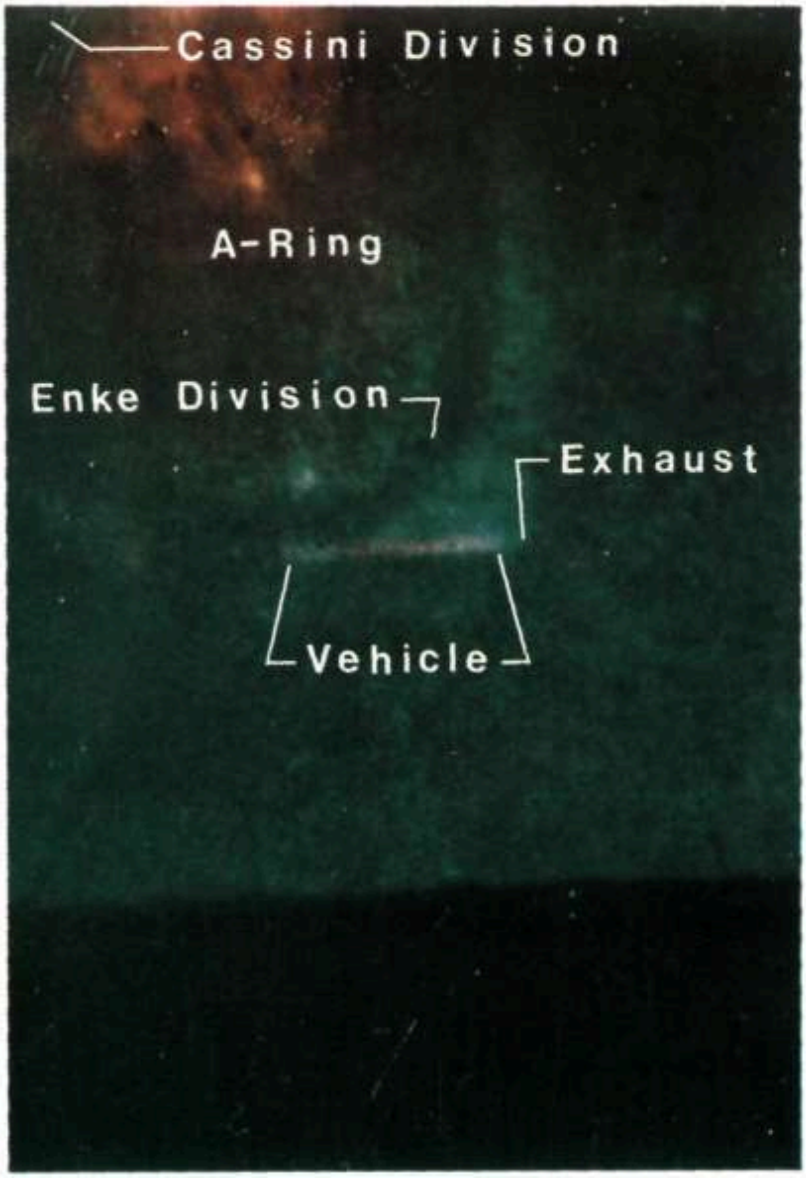


Plate 8*: A second vehicle substantiates the process by which the outer A-ring and the Enke division are formed.*

Were the same profuse efflux to occur completely along the vehicle length, little separation would prevail between the new trail and the older, inner A-ring deposits. Geometry of the trail and vehicle radial location produces an Enke division whose centerline is located inboard from the A-ring outer edge about 1/5 the A-ring width. Apparent fineness ratio of the vehicle is 13 to 1 as compared with 10 to 1 for the vehicle of Plate 7. Sizing yields a length of about 5200 km (3200 mi) and a diameter of 400 km (250 mi). While the two vehicles roughly are comparable in magnitude and quite similar in certain

respects, they also have differences. A notable difference is that the instant vehicle seems to have a longitudinal exhaust whereas the previous one very definitely does not.

Differences in length and longitudinal body-flux distribution lead to a difference in width of the Enke division. For the shorter vehicle, Enke-division width is about one percent of the distance between the A-ring inner and outer edges. For the longer vehicle, the Enke gap width is about 6 percent of A-ring width. Nominal values reported are in the range of 1 1/2 to 2 percent. A conclusion is reached that the A-ring outer annulus can be constructed with vehicles having different lengths and emission patterns. Therefore, the Enke gap can be located almost anywhere, or not at all, within the A ring depending upon length and positioning of the vehicles forming the inner and outer annuli. In view of this possibility, the difficulty of early observers in pin-pointing a single radial location for the Enke division is now readily understandable. Inability to obtain unanimous opinion for ring thickness is also explained.

Formation of the Cassini division might be expected to follow a development pattern similar to the Enke division. Specifically, a vehicle should exist which spaces the B ring inboard of the A-ring inner edge so as to form the Cassini division. That this expectation is realistic can be shown by Plate 9. In this plate, a partially developed ring system is shown exhibiting a cylindrical vehicle positioned across the B ring. An apparent included angle of about 30 degrees is formed by two imaginary lines having a point of intersection on the ring's outer edge. One line is the vehicle longitudinal axis and the other, a line perpendicular to the outer ring edge (i.e., a radial line) at the point of intersection. Body angularity less than 90 degrees with respect to the radial direction indicates that the vehicle occupies a slewed position within the ring. A slewed position is consistent with that observed for vehicles located in the inner and outer A-ring annuli.

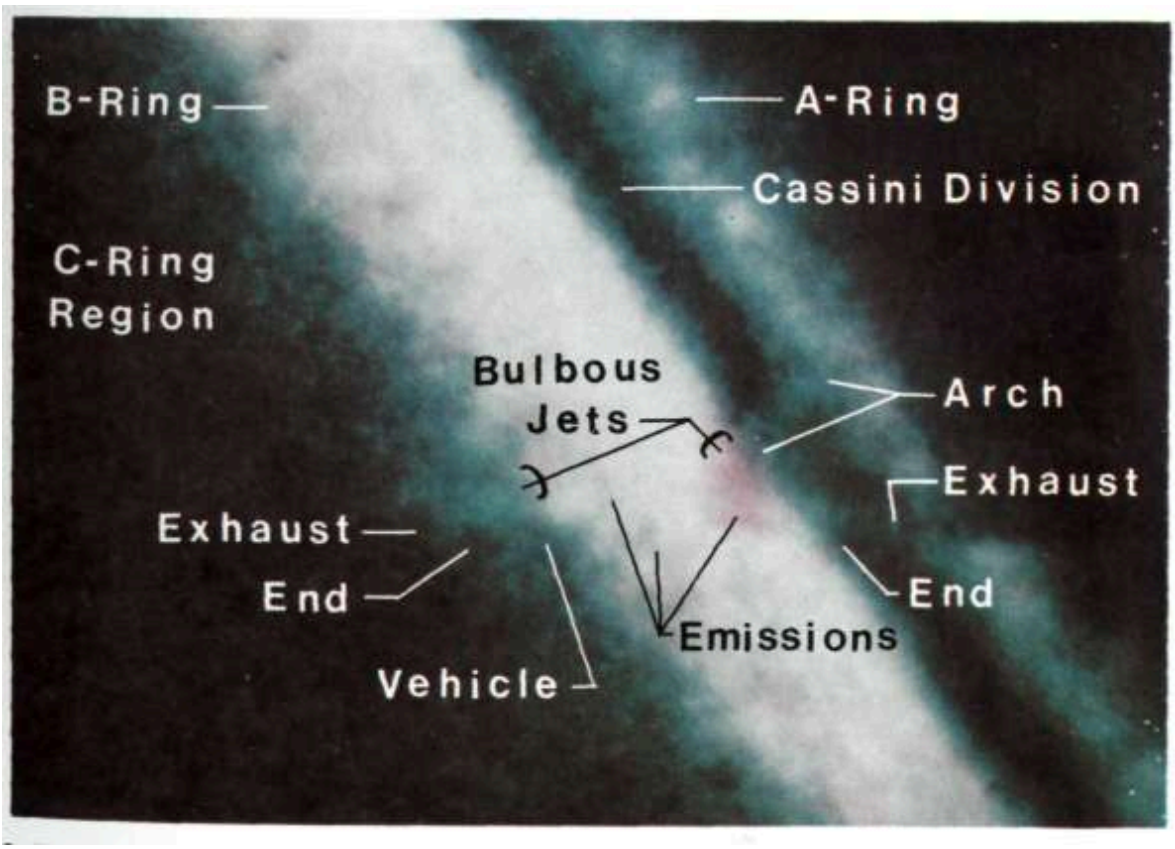


Plate 9*: Partially developed ring system exhibiting a transversely positioned cylindrical vehicle in the B-ring.*

In Plate 9, ends of the B-ring vehicle are labeled. At the left end, a short length of axial exhaust is detectable. An implication is that condensed and solidified exhaust products are the primary constituents of the C ring. At the right end, the axial exhaust stream can be identified passing through the A ring. Penetration of the stream through the A ring vaporizes in-path material and renders the ring discontinuous. Also at the left end, three bulbous jets of matter are ejected. Towards the right end, three more bulbous jets emerge from a small common area. Quite likely all the bulbous jets are pinched plasma formations inasmuch as the presence of substantial heat in exhaust products is indicated. Emissions at other body locations are identified in the plate. All the ejected matter, except for the right-end bulbous jets, provides intimate substance and texture to the B ring. The right-end jets rise above the vehicle, form an arch and connect with the A ring. Apparent fineness ratio of the body is in the neighborhood of 13 to 1. Rough sizing places vehicle length at about 29,500 km (18,300 mi) and the diameter at 2250 km (1400 mi).

That vehicles do not confine themselves only to positions in the A and B rings is illustrated by Plate 10. Shown in the plate outside the A ring is an emitting slender body positioned near the F-ring location. Axial exhaust appears to emanate from the body ends, locations of which are identified. Issuing from topside at the right end of the vehicle is a long streamer which extends leftward toward the A ring. This long streamer and the axial emissions are primary contributors to a massive cloud which forms in the vicinity of the vehicle. Secondary contributors are jets discharging laterally (not labeled).

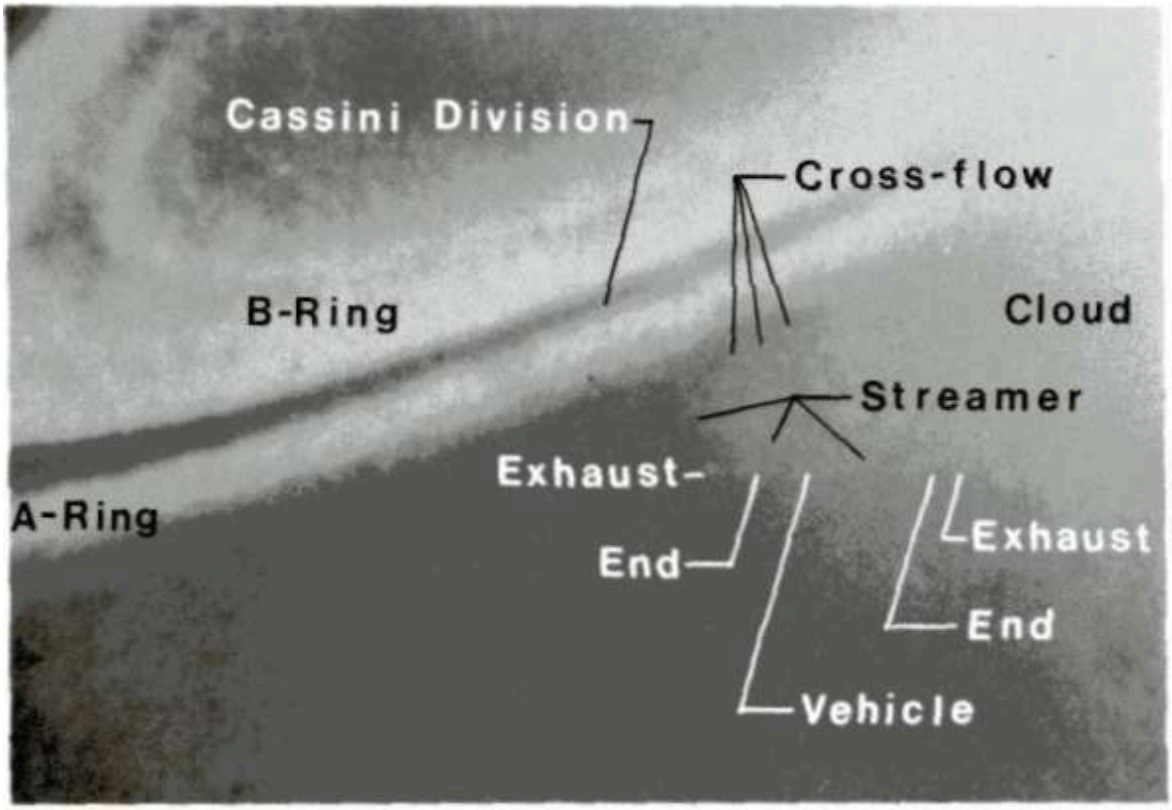


***Plate 10**: Emitting vehicle stationed outside the A-ring encompasses the F-ring location.*

Highest cloud density occurs below the A ring near the right edge of the photograph. This occurrence suggests a long axial exhaust emission which, owing to very elevated temperature, requires a considerable distance before the constituents reach the cloud-forming condensation point. Lowest cloud density occurs below the body, attesting to the comparative minor nature of lateral and downward emissions. Intermediate cloud density is displayed

between the trailing streamer and the A ring. In the vacuum of space where the environmental pressure is practically zero, a cross-flow can occur only because of an electrical pressure difference between two points. An electrical pressure differential causes electricity or electrons to flow from the higher pressure to the lower one. These flowing electrons necessarily must come from a highly ionized volume of matter, an obvious source of which is the vehicle. This situation again points to the reasonable presence of pinched plasma formations. Overall cloud breadth is estimated to be of the order of 3 earth diameters. Apparent fineness ratio of the vehicle is about 12 to 1.

In summary, the A and B rings are formed by slender mobile vehicles trailing massive efflux. The Cassini division and the Enke gap within the A ring are created simply by definite radial spacing of the respective formative bodies. The C-ring and the F-ring formations apparently depend upon the presence of a nearby vehicle. At birth, the A and B rings appear to have electromagnetic properties. In view of the generating mechanism, heretofore confusing variations in observational results now become explicable.

CHAPTER 4

Electromagnetic Vehicles

Mobile capability and prevalence of slender vehicles introduce a distinct possibility that similar units might exist beyond the F-ring region. Further, presence of a vehicle is likely whenever rings appear. Such likelihood is in consonance with the explanation for the A and B rings. Specifically, a vehicle-ring coupling exists because exhaust products and body efflux supply ring constituent material. This coupling characteristic renders the expansive E ring, positioned roughly between 3 and 8 Saturn radii, a highly suspect candidate for additional activity. Orbiting within this 5-radii wide annulus are Saturn moons, Mimas, Enceladus, Tethys and Dione. Rhea orbits outside the E ring at 8.7 Saturn radii. Conceivably, any of these moons might be shadowed by one or more of the massive and powerful slender vehicles.

Fortuitously, Voyager 1 obtained a photograph of Saturn which captured images of most of the aforementioned moons. This photograph, presented as Plate 11, shows Saturn, five Saturnian moons and an unexpected luminous image. Named clockwise starting at the upper right, the moons are: Titan, Enceladus, Mimas, Rhea and Dione. The luminous image lies between Dione and Rhea. Superficially, this image would appear to be a moon-like object comparable in size to its adjacent companions. Logically, a question arises as to the validity of this image. Is the image an artifact of processing, or does it indeed represent the image of a real object?

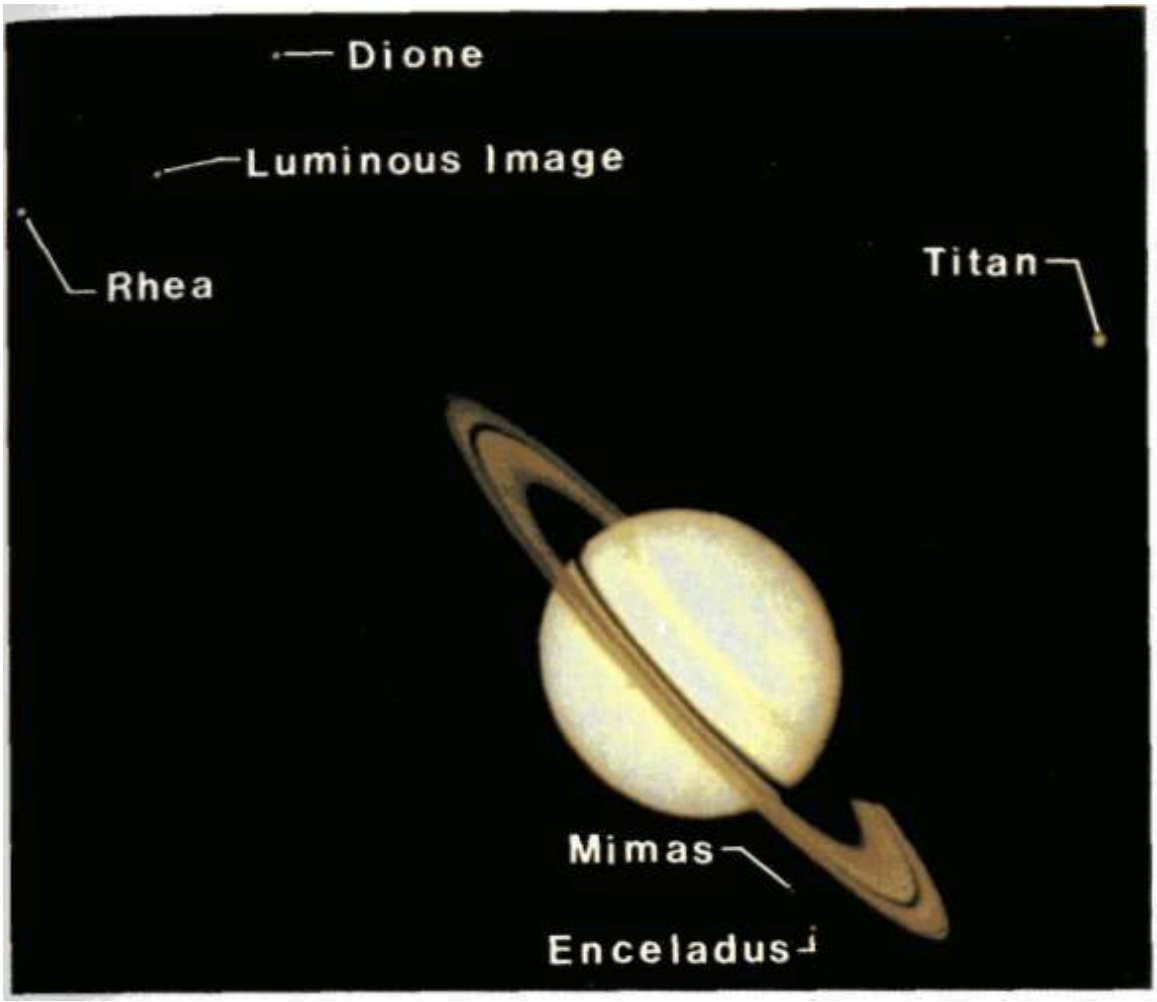


***Plate 11**: Saturn, five Saturnian moons and an unexpected luminous image.*

Indications are that the image is that of a real object. Mimas and Enceladus are only about half the size of Dione and Rhea; yet these two moons show clearly. This observation, in absence of any specifically cited photographic malfunction, mitigates against a processing artifact. Position identification of Titan, Mimas, Enceladus, Dione and Rhea is consistent with later known positions of these moons. However, the position of the luminous image between Dione and Rhea does not coincide with the calculated location of Tethys, the only possible moon candidate. Were Tethys in fact within the camera field-of-view, this moon ought to be visible inasmuch as its size is comparable to Dione and Rhea. Because Plate 11 is devoid of visual depth, graphic pictorialization is helpful to gain further understanding of the luminous image.

By scaling Saturn and its rings in Plate 11, a facsimile can be constructed in which clarifying detail of the ring plane can be provided. Results are presented in Plate 12. This plate pictorializes the luminous image in positional relationship to Saturn, the A, B and E rings, six near moons and their orbital paths. Boundaries of Plate 11 are shown by dashed lines. Calculations place Tethys about 2/10 the straight-line distance between Dione and Rhea, and in an orbital path whose radius definitely is shorter than that for the image. Discrepancies in both radial and angular positions of Tethys with respect to the image would indicate that the image indeed is not Tethys. Because Tethys and Dione are very nearly equal in diameter (1050 and 1120 km respectively), a reason should exist for obstruction of Tethys' appearance in Plate 11.

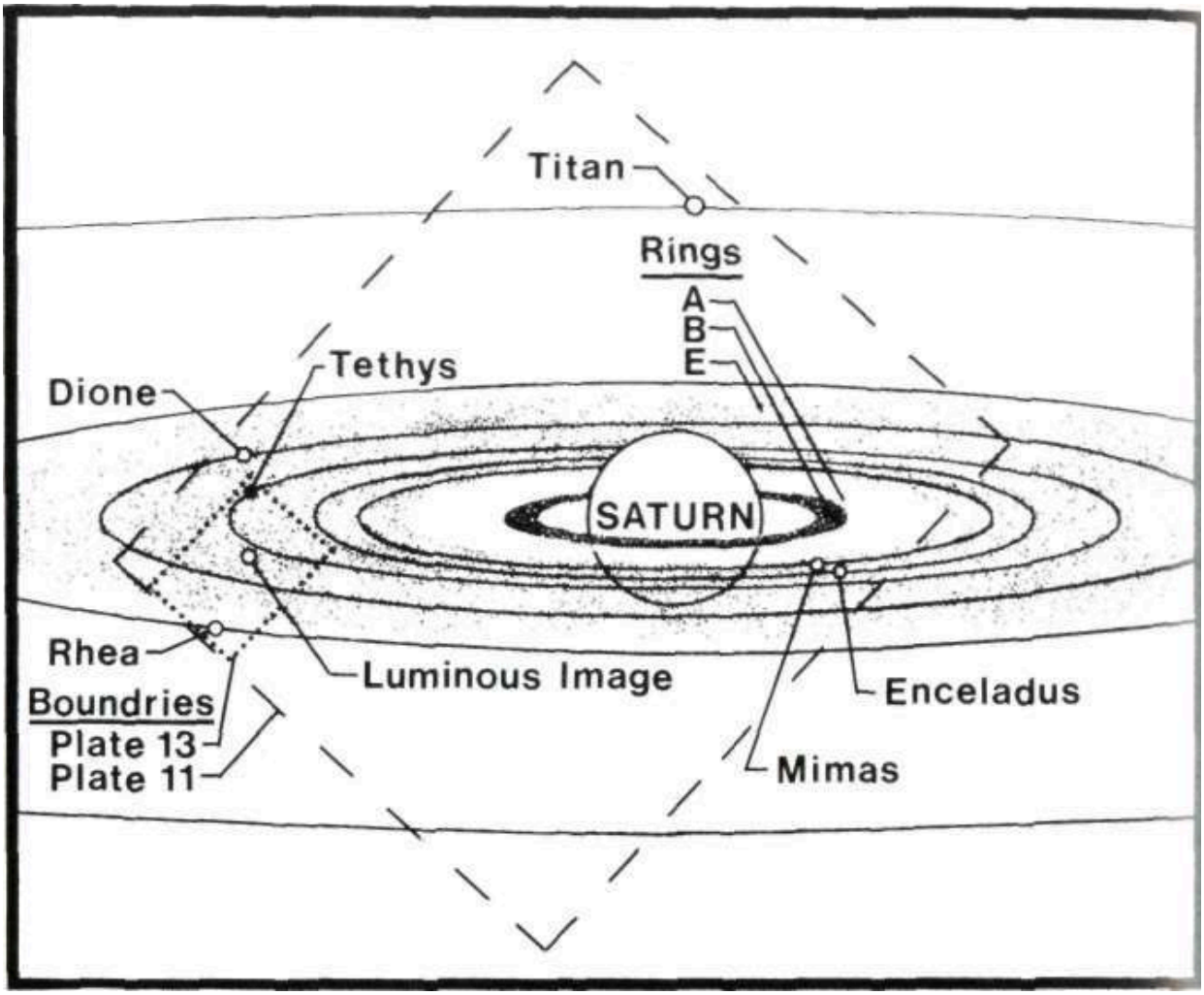


***Plate 12**: Pictorialization of luminous image in positional relationship to Saturn, the A, B and F rings, six near moons and their orbital paths.*

Certainly, this obstruction can not be caused by Tethys' two small companions whose largest dimension is of the order of 35 km and which, moreover, follow the same orbital path. Also, little likelihood exists of mistaking the companions for the luminous image because of their exceedingly small size. Conclusive insight regarding the true nature of the image and surroundings rests finally on revelations of micro-photographic details of the region enclosed by the dotted lines. Note that the dotted-line enclosure excludes Dione and that it does include the calculated position for Tethys. Also observe that Rhea is included at the extreme left, just outside the E ring.

Micro-photographic details of the region shown in Plate 12 are presented in Plate 13. This enlargement of the luminous image in Plate 11 reveals a nearby slender vehicle within the E ring. Were the picture three dimensional, the body would be seen tilted out of the plane of the paper at an angle of about 45 degrees. The one visible end of the body and the exhaust therefrom are labeled in the picture. The other end lies obscured behind a luminous jet which projects laterally leftward from the body. Emissions issue in knotted rolls both above and below the lateral jet. These rolls develop an expansive labyrinth giving the E ring a cloudy appearance. The labyrinth below the lateral jet serves as a connection to the image. A second connection is created by emissions from the body. Specifically, below the forebody, this connection is established through two nearly concentric toroids interconnected radially with roll segments, like spokes of a wheel. One of these spokes connects with the upper edge of the luminous image. This spoke, the two toroids, and a central hub are identified in the plate.

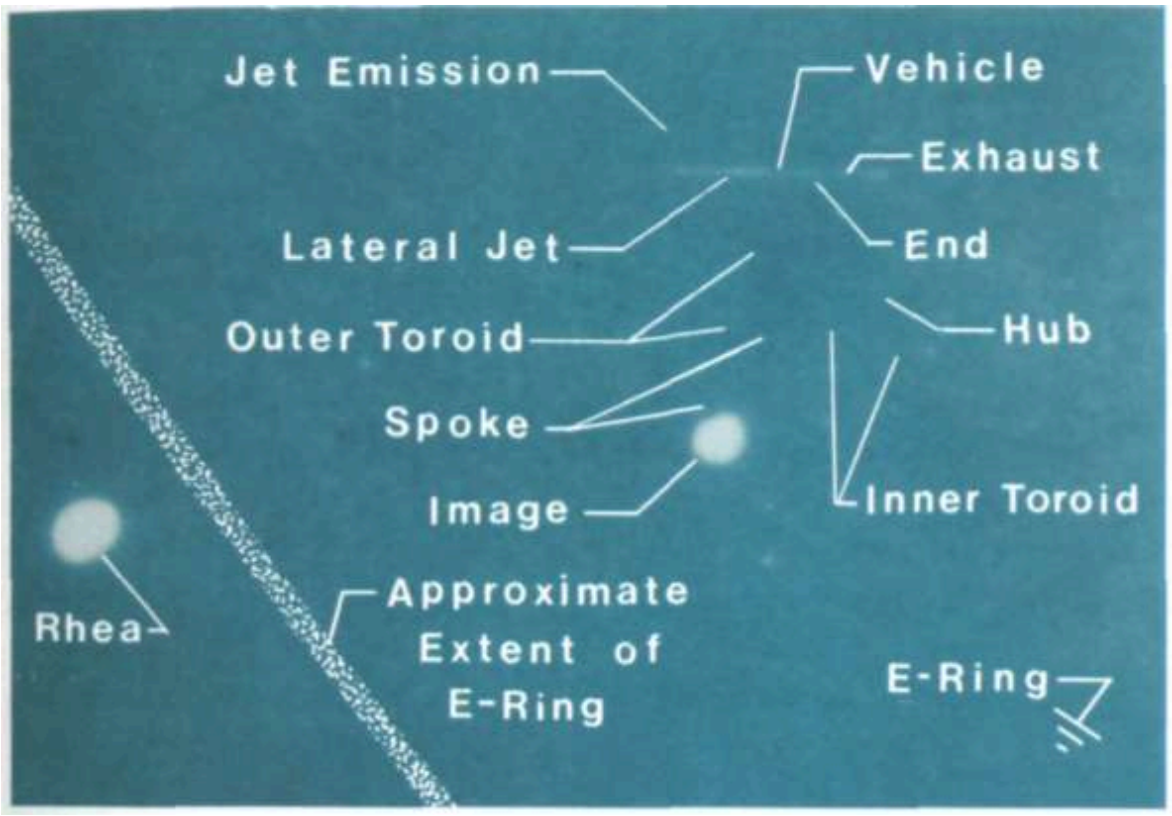


***Plate 13**: Enlargement of luminous image revealing a nearby slender vehicle within the E-ring.*

Presence of toroidal formations is considered indicative that the emissions have electromagnetic properties. The two different connections between the body and image become paths by which a potential difference, or voltage, can be delivered remotely to a point in space. When the termini of the paths are sufficiently close to permit current flow, a luminous arc could be produced as suggested by the photograph. Were the current path, perchance, to be through and around some intermediate object, conceivably that object might become highly illuminated.

In view of the physical environment surrounding it, the luminous image certainly cannot be a photographic artifact. This conclusion, however, calls for a reason why Tethys is not apparent in the picture. The reason is that proliferous efflux from the vehicle blocks Tethys from view. However, whether the image in the plate is, or is not, Tethys really need not be resolved conclusively. The important emerging fact is that all moons in the E ring can, at some time, be within immediate range of a vehicle capable of large-scale electromagnetic influences. Also, consistent with findings

concerning formation of Saturn's other rings, the E ring is caused by a vehicle spewing matter.

For further examples which demonstrate the electromagnetic character of slender vehicles, attention is invited to Saturn itself. Plates 2 and 3 illustrate that Saturn's outer atmosphere has distinct latitudinal stratification extending from pole to pole. These strata can be viewed as thick planar rings, of varying diameters, centered vertically atop one another north to south. This multi-layer ring concept of the outer atmosphere carries the idea that strata might be vehicle related. In this context, presence of slender vehicles in Saturn's atmosphere would be a reasonable expectation. Easy identification, however, is thwarted because clouds (emissions) tend to obscure the sources being sought. This difficulty, though, can be circumvented.

Plate 14 presents a sector of the southern hemisphere of Saturn showing cloud strata, a curious luminous point, location of a lightning source and a slender vehicle. In the plate, the luminous point occurs below a dark slender object, axially aligned with an overhead latitudinal cloud stratum. This isolated body is labeled a vehicle because it has an apparent fineness ratio of about 13 to 1, and also because it evidences emissions. At the horizon left of the vehicle, a lightning source and a lightning location is indicated. The source, a small "tick" protruding into space, can be discerned upon close scrutiny. Lightning streaming from the source is faint and hence difficult to distinguish. However, the intent at this juncture merely is to call attention to event locations.

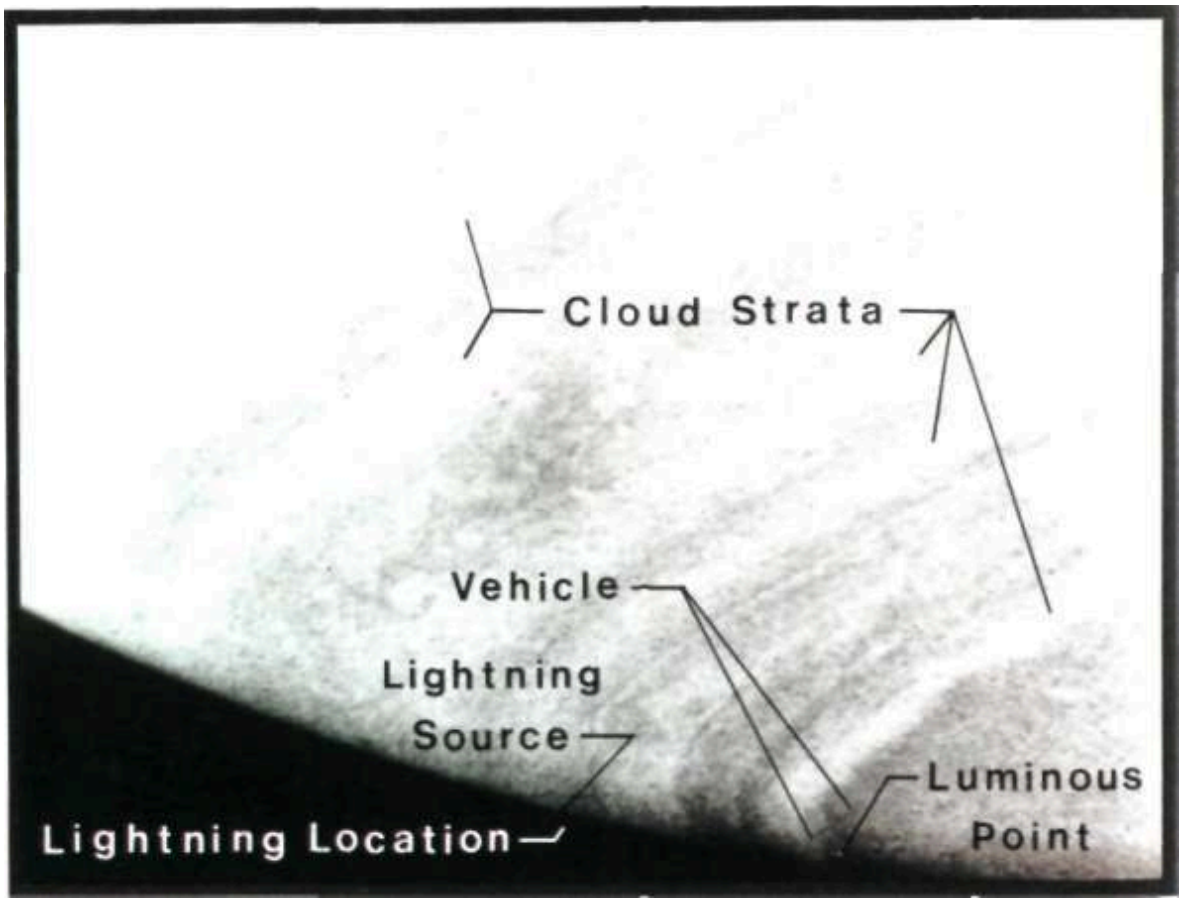


Plate 14*: Sector of southern hemisphere of Saturn showing cloud strata, a luminous point, location of a lightning source and a slender vehicle. (Non-optimum exposure for overall picture favors the dark region at planet horizon).*

Imagery is clarified in the enlargements of Plates 15 and 16 used for subsequent discussions. Plate 15 presents an enlargement of the luminous point in Plate 14. The purpose of the instant plate is to illustrate that the luminous point essentially is an arc light whose apparent power source is a remote vehicle capable of generating paths carrying electricity. The vehicle along with a couple of its emissions are identified in the upper left corner of the picture.

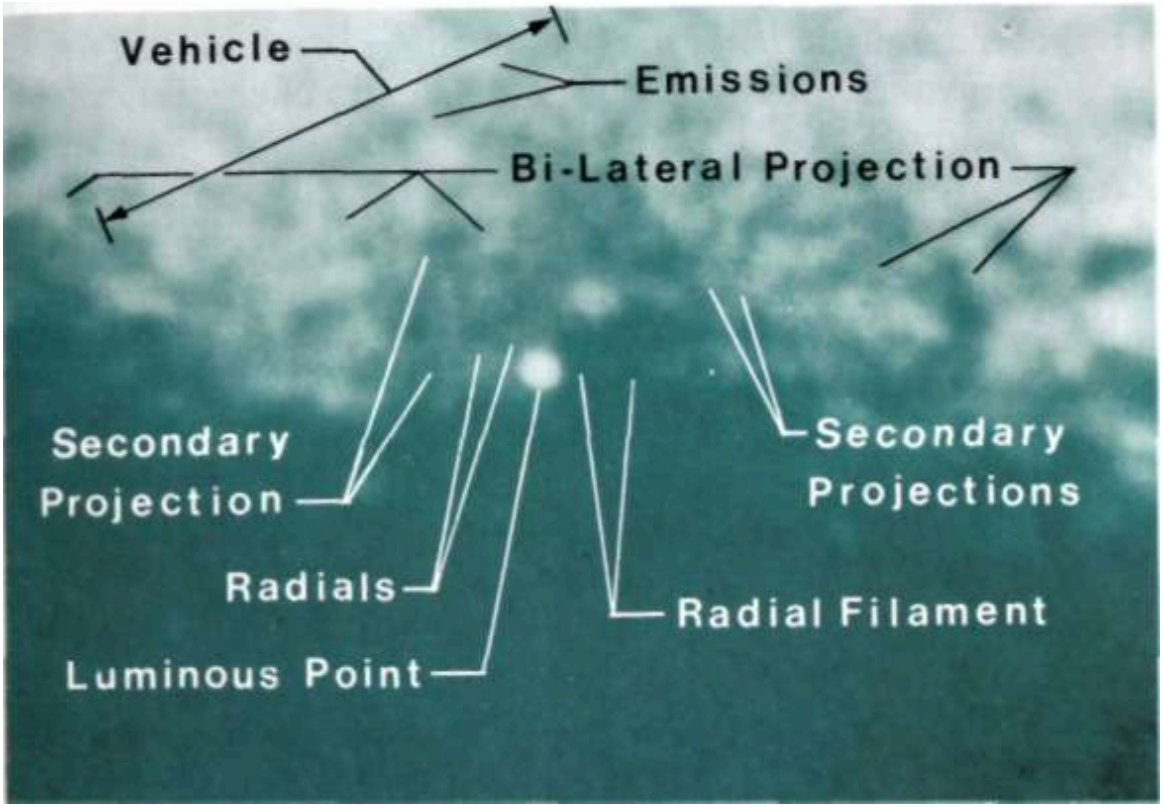


***Plate 15**: Luminous point of Plate 14 essentially is an arc light whose apparent power source is a remote vehicle capable of generating paths carrying electricity.*

From the lower left end of the vehicle, a very long, slender element projects from each side. This element, labeled a bi-lateral projection, in turn issues other projections along itself. Several of these secondary projections lead to the luminous point. Connected to the point are a number of radial filaments which variously connect with the projections. The result is that the luminous point becomes a center of mis-matched electrical potentials; and illumination is generated in much the same manner as for an arc light. Light diameter at the converging intersection of electrical paths is estimated to be in the neighborhood of 45 to 50 km (28 to 31 mi). Distance from the originating source of potential appears to be of the order of 500 km (310 mi). A characteristic of arc light is high thermal temperature. Temperature of arc lights employing earth technology is limited chiefly by the melting temperature of the electrodes (analogous to filaments) which supply potential differential. For carbon electrodes, this limit temperature is about 3700 degrees Celsius (6700 degrees Fahrenheit). Even this modest temperature is adequate to melt most solids indigenous to earth. The

luminous-point filament electrodes, in all probability, develop much higher temperatures. Because the isolated luminous point of light implies a current flow, which in turn implies a magnetic field, the conclusion is reached that the source vehicle and surroundings are electromagnetic in character.

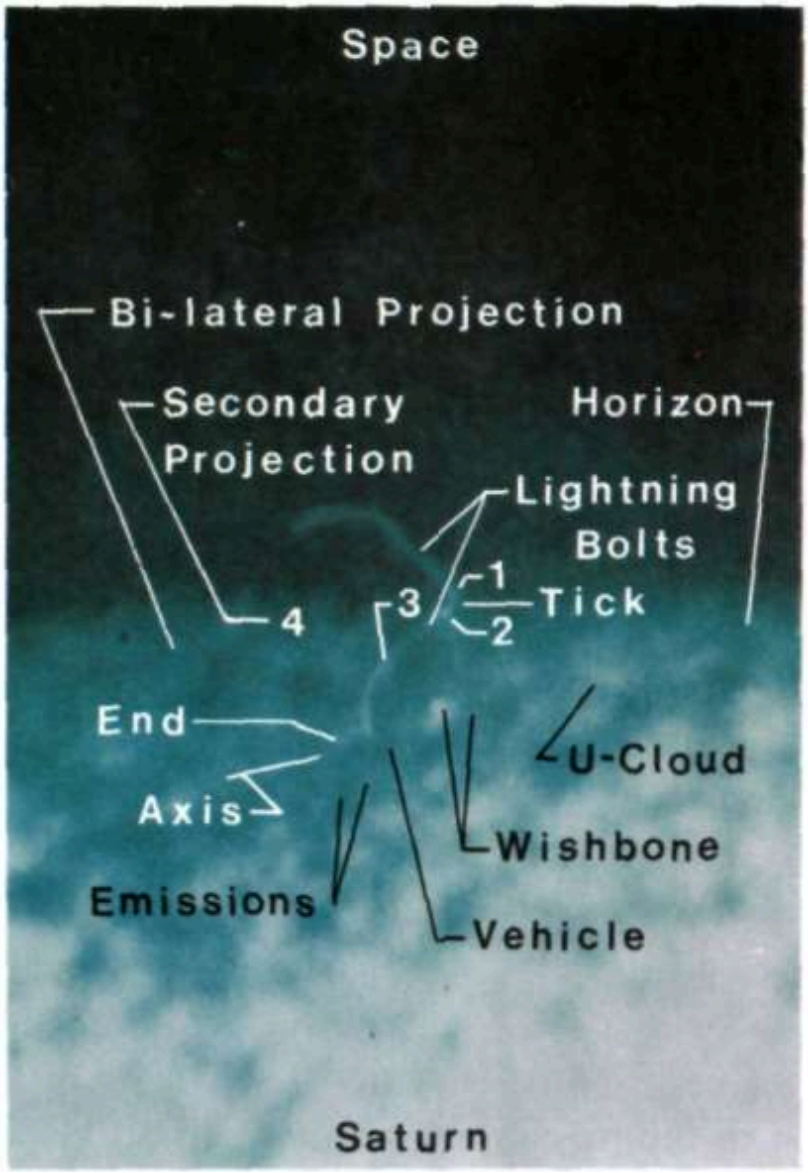


***Plate 16**: Two lightning bolts appear in and above Saturn's cloud tops. Photograph is an enlargement of Plate 14 in the area labeled "lightning location".*

Plate 16 presents two lightning bolts in and above Saturn's cloud tops. This photograph is an enlargement of Plate 14 in the area labeled "lightning location" and "lightning source". To improve visual orientation, the picture

has been inverted so that dark space occurs in the upper half of the frame and a small section of Saturn in the lower half. In the discussion of Plate 14, the terminology "tick" protuberance has been used in referring to the lightning source. This plate reveals that adjoining points (1) and (2) really constitute the "tick" protuberance.

The lightning location is clarified in that a lightning bolt emanates from point (1), and another is connected contiguously to point (2). Length of the upper lightning bolt is estimated to be of the order of 400 km (250 mi). Length of the lower bolt is of the order of 350 km (220 mi), for a total length of 750 km (470 mi). Bolt diameter is in the neighborhood of 10 to 12 km (6 to 7 mi). Power to energize this impressively long path to luminous visibility can be traced to a cylindrical vehicle positioned directly below the lower lightning bolt.

Helpful clues regarding vehicular presence are two "wishbone" shaped filaments, the spread ends of which straddle the cylindrical body. Point (2) locates the tip of the larger wishbone filament and point (3), the smaller. Lateral spread in each of these filament pairs helps establish the body breadth and also the orientation of the longitudinal axis, shown added in the plate. One end of the body appears to lie to the left of the lower lightning bolt about 3 bolt-widths away. Highlighting the left end is a luminous "exhaust stack" having a rounded leading-edge profile which presents an elliptical face. An elliptical end face is consistent with an angular view of the longitudinal axis for a body having a circular cross section. The right end of the vehicle is considered to lie centrally beneath a U-shaped cloud bisected by a small roll cloud. Inferentially, the bottom tip of the lower lightning bolt would appear to originate from a port in the side of the vehicle.

Upon port exit, ejecta rise up across the body surface, then turn rightward to bridge points (3) and (2). Flow continues into pivotal point (1). At (1), the lightning-bolt direction changes abruptly to the left, traverses a sinuous path and then fades to completion at point (4). Point (4) lies at a distant secondary projection on the left arm of the bi-lateral projection. A simple explanation for the progression and sustenance of the lightning bolt is that successively smaller electrical potentials prevail sequentially along the course. Progressively reduced potentials would cause ejecta originating from the port to arc to points (3), (2), (1) and (4), respectively. These lightning bolts

have some resemblance to terrestrial lightning, but they are far more immense in both length and breadth. This immenseness implies an intense magnetic field having substantial far-reaching effect in terms of reacting with other existing fields. Many strange shapes might occur because of such interaction. A propulsive body capable of creating such an environment, indeed, appropriately is called an electromagnetic vehicle.

CHAPTER 5

A Massive Display of Power

Saturn investigations for years have portrayed the ring system as comprised of primordial matter. The utter idea that the rings might be quite young is uncomfortable to primordial advocates because a key assumption is placed in jeopardy. Previous chapters have pictured several different electromagnetic vehicles actually depositing the A and B rings (Plates 5, 6 and 7). These fortuitous pictures say not only that the ring material is quite new, but also that continuous regeneration can occur. Conversely, ring extinction by vaporization is a realistic possibility. Vaporization could result consequentially from the immense, high-temperature luminous, mobile forms which can be generated. Exemplary forms are a fire ball larger than earth's moon (Plate 6) and a lightning stroke almost as long as the State of California (Plate 16). Yet still, these displays of power are fairly modest.

One of the most massive displays of power is a large-scale disruption in Saturn's rings extending across the entire ring system. This dramatically colorful display, presented in Plate 17, gives the rings an appearance of being shifted rightward within a narrow band. A discontinuity band, such as this, is rare in photographs of the A and B rings. Hence the phenomenon likely is aperiodic and of fairly brief duration - perhaps days, or even hours.

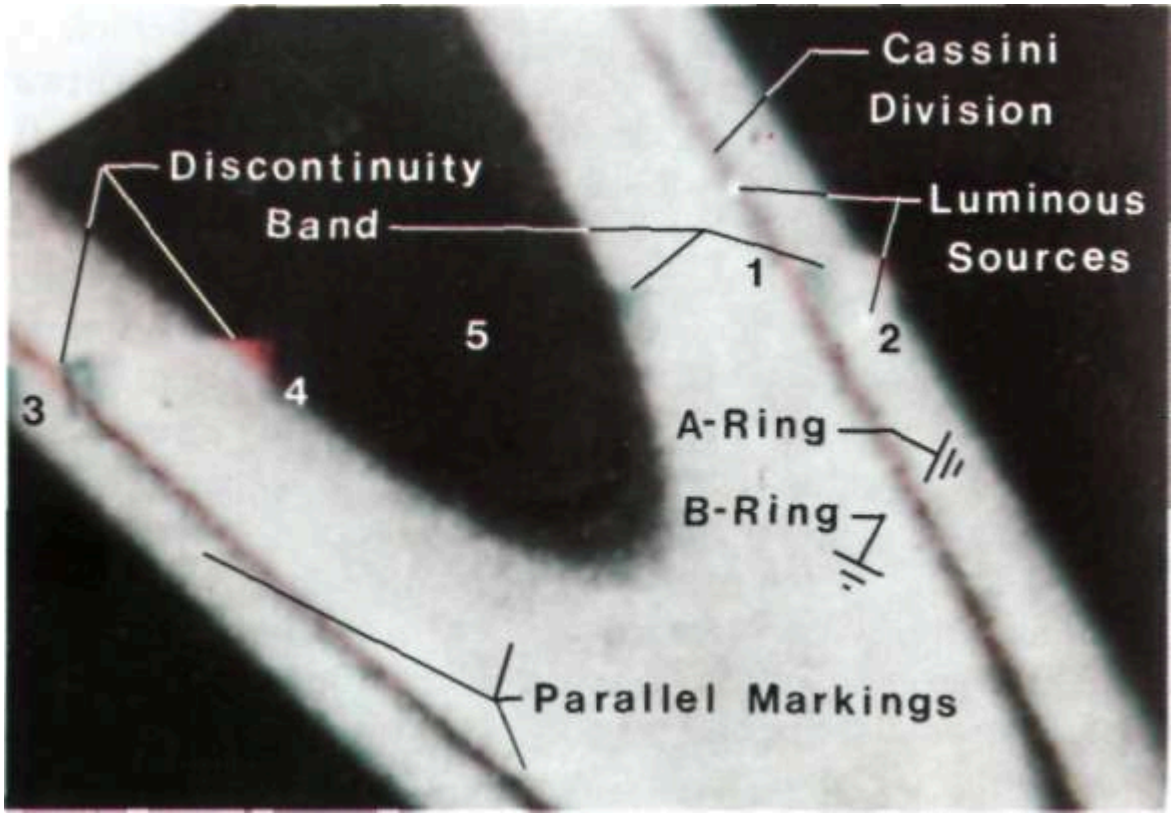


***Plate 17**: A colorful, large-scale narrow-band disruption in Saturn's rings extending across the entire ring system.*

In addition to the multicolored band, very narrow parallel markings can be seen extending chordwise across the rings in several locations. Further, two luminous sources appear in the right-hand sector of the rings. One is positioned in the Cassini division above the discontinuity band, and the other is located just below the band in the A ring. Noteworthy, too, is the completely filled Cassini gap. Usually, this gap appears mostly as empty space. An astounding 218,000 km (136,000 mi) is spanned by the colorful band, roughly the equivalent of 17 earth diameters. Band width is in the neighborhood of 3000 km (1850 mi), equivalent to about 3/4 the distance across the continental United States. Contained within the narrow rectangular area across the rings is an area of about 670 million square kilometers (approximately 260 million square miles). Thus, the affected region exceeds the total surface of the earth, which is about 510 million square kilometers (197 million square miles). Obviously, a disturbance of such great magnitude requires immensely enormous energy. Insight concerning the physical situation in and near the discontinuity band is

provided by subsequent plates presenting enlargements embracing localities at points labeled 1, 2, 3, 4 and 5.

Presence of electromagnetic vehicles on the right side of the ring system in Plate 17 is clued by two luminous sources. Plate 18 identifies these sources and pinpoints vehicles contributing to the apparent ring shift and to a filled Cassini gap. Involved are at least 5 vehicles, locations of which are numbered (1) through (5). These are discussed in numerical order.

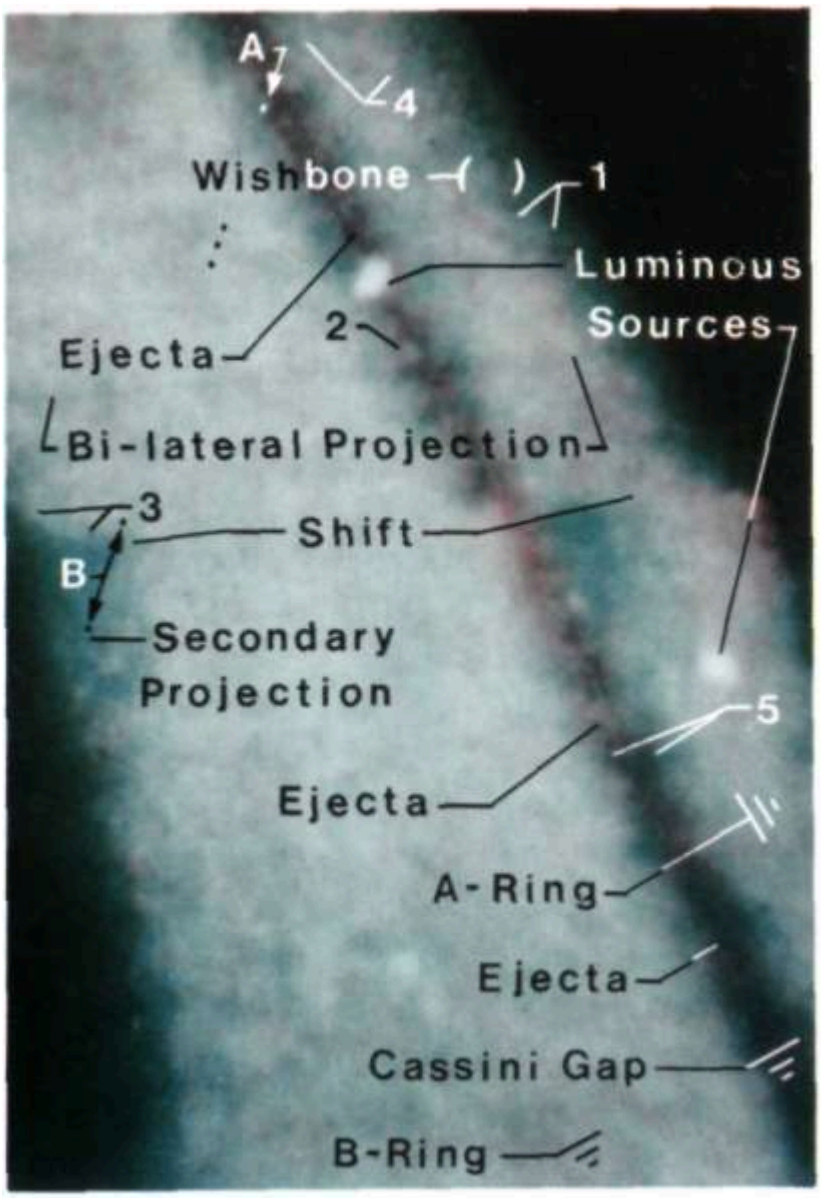


***Plate 18**: Luminous sources provide clue to presence of electromagnetic*

vehicles as a causative mechanism for a filled Cassini gap and an apparent ring shift.

Of the five vehicles just mentioned, the first is positioned in the outer edge of the A ring. A substantial length of the visible body is subtended between the dual pointers of label (1). Toward the end, a wishbone filament can be identified straddling the body similar to those in Plate 16. Emissions from vehicle (1) feed the nearby luminous source. Another vehicle, labeled (2), pokes its nose slightly up out of the Cassini gap. Body ejecta and the luminous source hide all the body aft of the nose and also fill the Cassini gap. Each side of the vehicle (2) ejects a lateral emission, heretofore termed a bi-lateral projection in discussion of Plates 15 and 16. This projection extends completely across the A and B rings, a distance of the order of 42,000 km (26,000 mi). Below the bi-lateral projection, a blue-colored niche exists on the inner edge of the B ring. This angular niche is delineated by two skewed linear elements. One element is a vehicle, labeled (3), positioned at the upper left corner of the niche. The other element is a secondary projection, A-B, originating at a distant vehicle labeled (4). Vehicle (4) located in the A ring near the top edge of the picture, generates a leftward lateral projection from which the secondary emerges near B. The vehicle and the terminal end of the projection colorfully interact to create the angular niche. The interaction creates the impression that the B-ring inner edge locally is shifted toward the right.

Label (5) in Plate 18 directs attention to a cylindrical vehicle whose nose is located in the Cassini gap. From above and below the nose, ejecta form an occluded division between the A and B rings. Plate 19, an enlarged view, reveals vehicle and ejecta detail and shows components of the A-ring discontinuity, the apparent ring shift and a luminous source. All these interconnected events are occasioned by the presence of an electromagnetic vehicle. A two-pointer label locates the vehicle with respect to the B ring and the Cassini gap. Within the spread of these pointers measured along the top element, about 2 body diameters of length appear in dark color. About another body diameter of length can be discerned covered with a mantle of cloudy efflux. Vehicular angular position is such that efflux from the top and bottom of the nose fills what normally would be the open Cassini division, or gap. Axial exhaust, whose diameter measures about 1/2 that of

the body, is projected into the A ring and creates a blue area there. A rope-like appendage, or tongue, is attached beneath the nose.

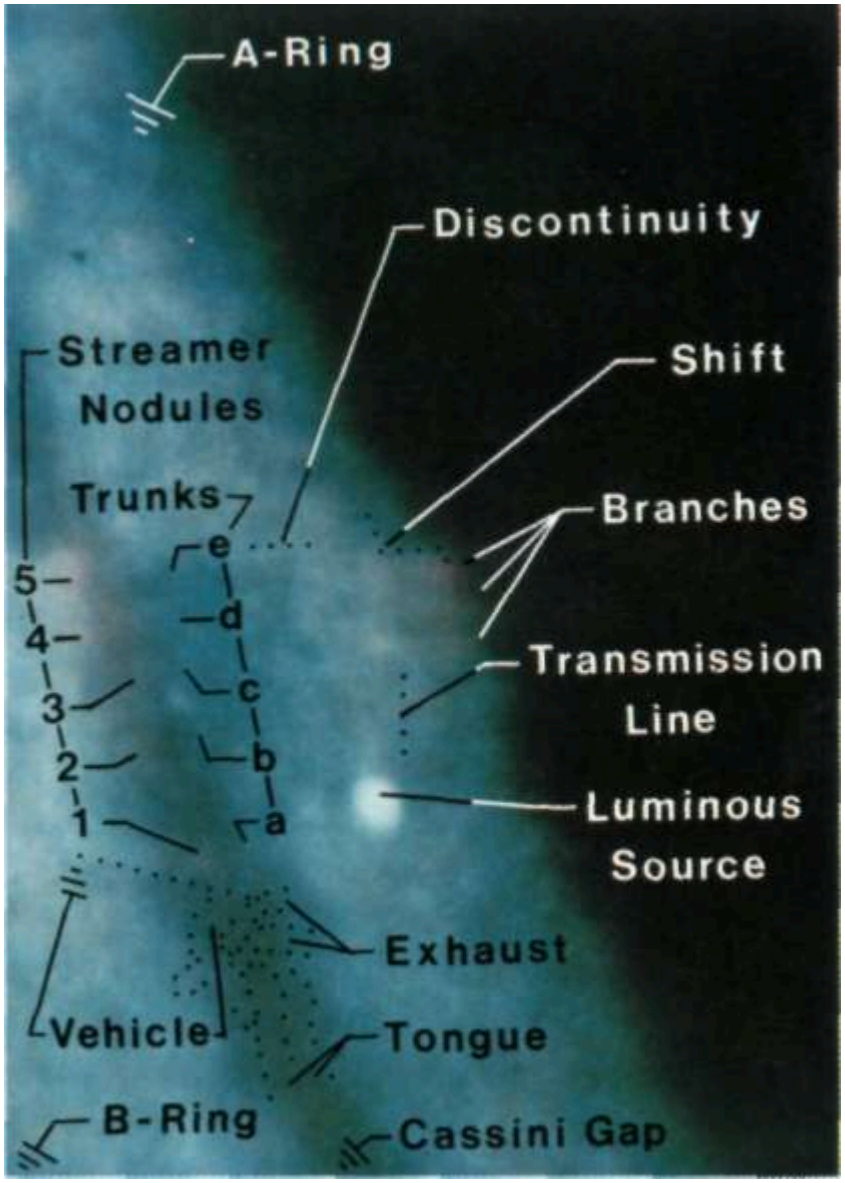


***Plate 19**: Vehicle and ejecta in the Cassini gap in relation to an A-ring discontinuity, apparent ring shift and a luminous source.*

Above the nose, a stream of ejecta trails aftward and separates the A and B rings. This streamer consists of 5 interconnected nodules*, labeled (1) through (5). Each nodule grows a lateral trunk, the five being designated by letters (a) through (e) to match nodules (1) through (5), respectively. Upper trunk (e) causes the discontinuity in texture of the A ring.

**Nodular streams are characteristic of pinched-plasma flows and have electromagnetic properties.*

Trunks (c), (d) and (e) develop 3 colorful branches which extend beyond the A ring and provide the appearance of a local ring shift. Trunk (a) is connected directly to the luminous source. Branches of trunks (c), (d) and (e) also are connected to the luminous source. Branch connections are made by an intermediate straight-line element labeled a transmission line. Between the end of the transmission line and trunk (a), a luminous arc is drawn. This arc, or luminous source, is about the size of earth's moon. Structural manipulation of the A ring and development of such a large luminous source convey the sense of tremendous power inherent in the vehicle.

On the left side of the ring system in Plate 17, there are no luminous sources to signal the presence of electromagnetic vehicles. However, findings from Plate 19 reveal that a completely filled Cassini gap is a positive indicator. An enlarged view has been made of Plate 17 in the vicinity of location-label (3). This view, introduced as Plate 20, shows the apparent ring shift and band discontinuities in relation to two electromagnetic vehicles in the Cassini gap. Picture orientation has been rotated clockwise 90 degrees to facilitate feature recognition. One vehicle is labeled (1), and the other (2). Each nose position is indicated by a pointer. Both vehicles have substantial angle-of-attack with respect to the ring plane, perhaps as much as 30 degrees. Consequently, the aft end of each is below the ring-plane surface and, therefore, not identifiable directly. Unique emissions, or ejecta, along the body length confirm vehicular presence in the Cassini division.

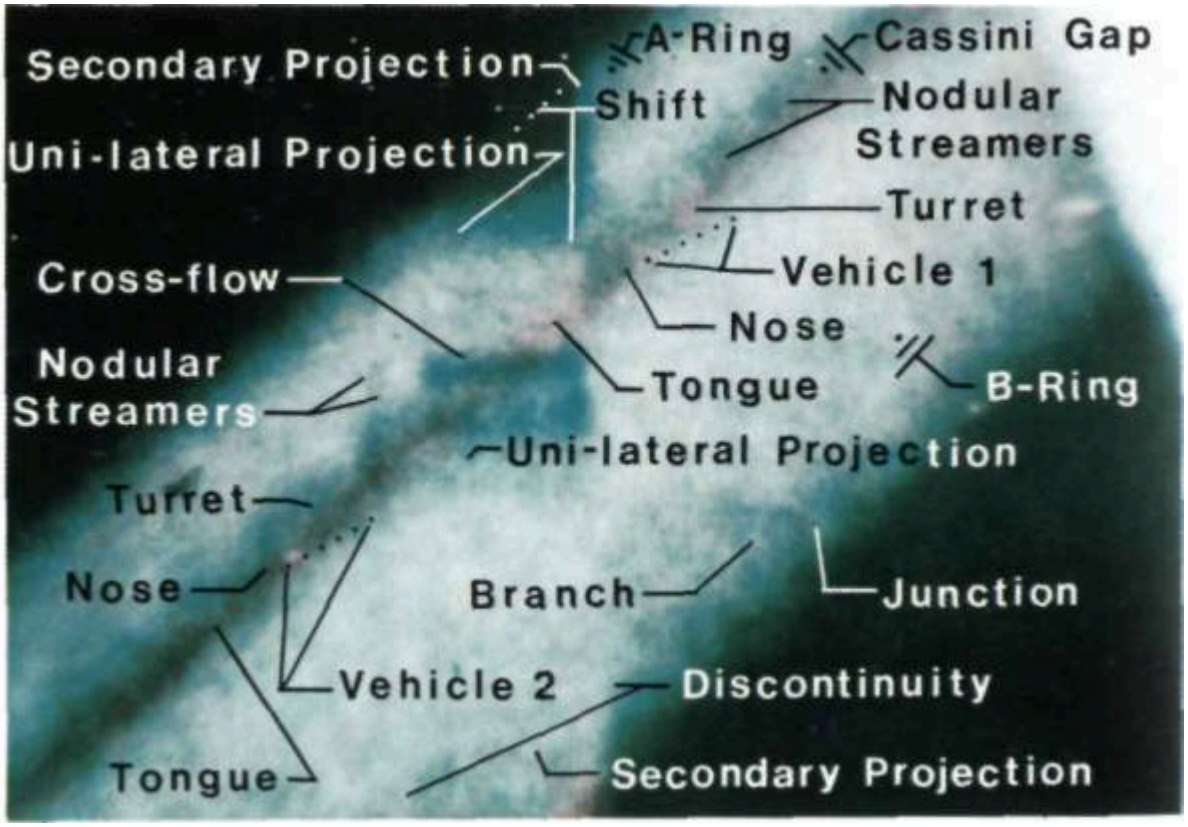


***Plate 20**: Apparent ring shift and band discontinuity in relation to two electromagnetic vehicles in the Cassini gap.*

At the nose of vehicle (1) in Plate 20, a unilateral projection extends leftward to demarcate the base of the niche in the A ring. About a body diameter left of the nose, a perpendicular columnar jet rises and extends to the edge of the A ring where it disappears. This jet is labeled a secondary projection as it originates from a primary uni-lateral projection. The two projections provide the horizontal and vertical boundaries of the niche which, impressionistically, appears as a local shift of the ring. Cassini-gap filler substances are produced for the most part by various emissions along top elements of the vehicle body. Nose ejecta also contribute. One of the sources of filler substances is a hemispherical unit, or "turret" located about 2 body diameters aft of the nose. Other sources are nodular streamers which are discharged directly from the body surface. Two such streamers, a large and a small one, are identified in the plate. The base of the larger one is positioned about 4 body diameters aft of the nose. The smaller one starts slightly aft of the larger one. Contributing nose ejecta take the form of a knotty curvilinear jet, or tongue, which protrudes from the bottom of the

nose. A secondary projection is emitted vertically downward from this tongue and causes the right-hand discontinuity across the B ring.

Vehicle (2) in Plate 20 is similar physically to (1) in that a tongue, a turret and nodular streamers appear in comparable locations. A unilateral projection also occurs, except that it is further aft, originating at the base of nodular streamers. Slightly outboard of the body, a downward secondary projection develops from the uni-lateral projection to which other body side-emissions contribute. The two downward secondaries supply the discontinuity boundaries of the apparent band shift. Cross flow directly connects the secondaries above the uni-lateral projection. Below, the uni-lateral projection itself interacts with the two secondaries to create somewhat of a diagonal flow. An additional element associated with vehicle (2) is a junction
located at the B-ring inner edge, functioning as a terminator for the uni-lateral projection. Having planar sides, this junction is tremendously interesting. Planar shapes can be constructed with electro-potential fields, but only with appropriate field combinations. Hence, such combinations are not likely to occur by chance. Inferentially, applied intelligence would seem to be required.

Examination of the discontinuity boundaries shown in Plate 20, specifically at the B-ring inner edge, leads to further discoveries. These discoveries, presented in Plate 21, become evident upon enlarging the region labeled (4) in Plate 17. Plate 21 reveals braided strands, a braiding unit and cross flow between discontinuity-band boundaries. Creating these discontinuity boundaries is the familiar pair of secondary projections originating at an electromagnetic vehicle in the Cassini division (Plate 20).

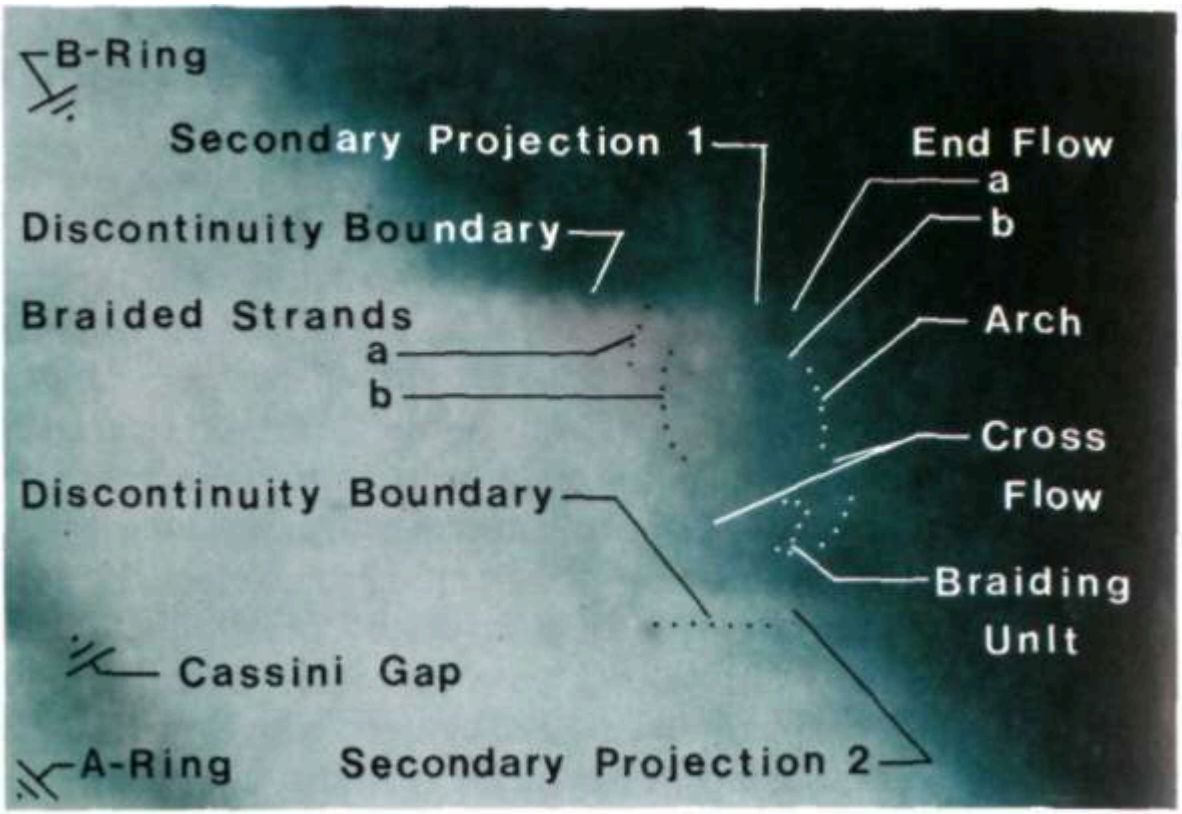


***Plate 21**: Braided strands, a braiding unit and cross flow between discontinuity boundaries at the B-ring inner edge.*

The projections, labeled (1) and (2), have about equal diameters and are spaced on centers about 6 diameters apart. Attached to the side projection of (1) is a pair of tightly braided strands (a) and (b). These strands are not connected to the side of projection (2) in the same manner as for projection (1). Instead, a connection is made to a stubby protuberance thereon. Distributed around the protuberance, or braiding unit, are individually attached strands comprising braided strands (a) and (b). While these separate strands appear quite narrow in the picture, actual width is about 90 km (56 mi). Considering that the originating source may be as much as 45,000 km (28,000 mi) distant, such flow is quite remarkable.

Issuing from the end of projection (1) are two filaments (a) and (b). One, (a), is positioned near the upper part of the terminal face; and the other, (b), is located centrally. End-flow filament (b) forms an arch between projections (1) and (2). Cross flow between the projections occurs because

of a relative potential difference. Arching is due to the potential causing reorientation of the initial flow direction.

Remaining to be examined is the central part of the ring system designated as region (5) in Plate 17. This region, exhibited in Plate 22, shows that B-ring emissions become C-ring constituents. In the plate, secondary projections (1) and (2), and end-flow filaments (a) and (b) are the same as previously identified in Plate 21. Similarly, the bilateral projection is the same as identified in Plate 18.

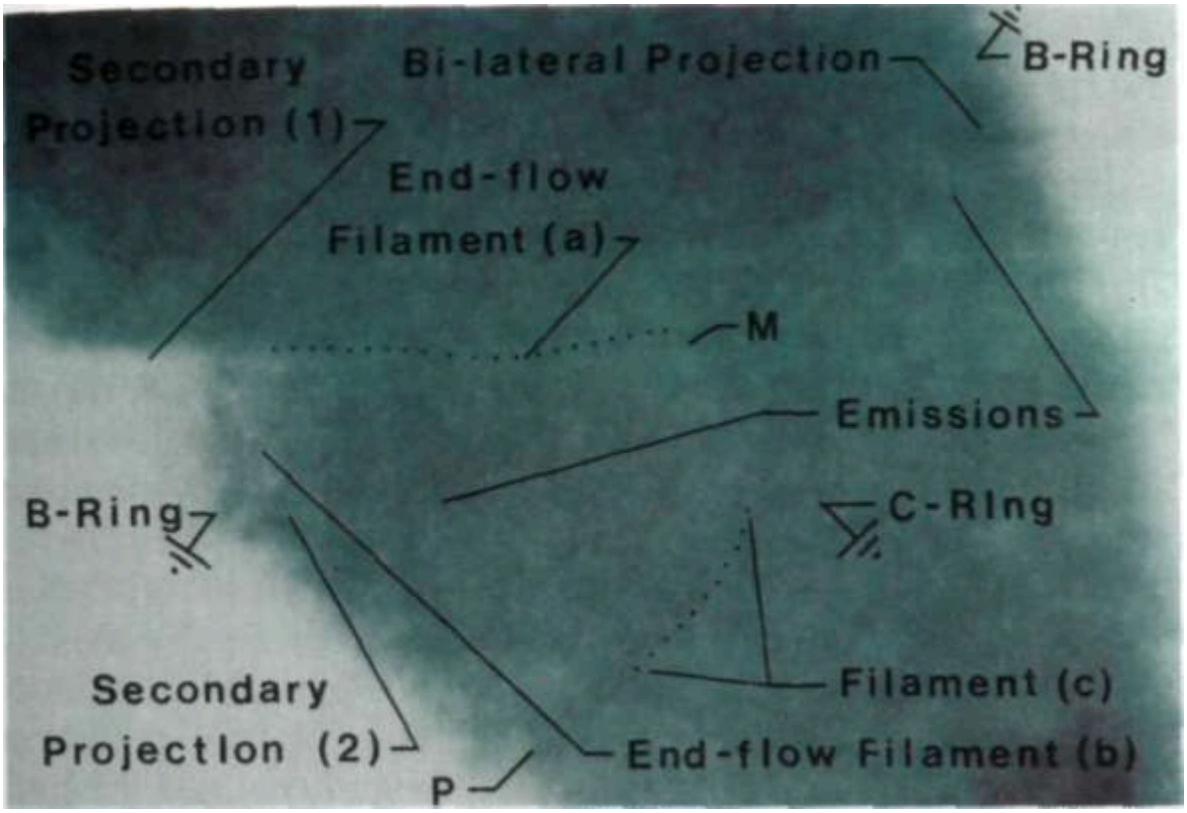


***Plate 22**: B-ring emissions become C-ring constituents.*

Confirming Plate 21, end-flow filament (b) connects with secondary projection (2). Filament (a) can be seen for the first time to extend about midway across to the opposite B-ring edge. Near the mid point, M, the flow arches back to a point, P, at the B-ring inner edge, analogous to the return of filament (b) to projection (2). The re-entrant flow element from point M is labeled filament (c). Emissions from filaments (a), (b), (c), the bi-lateral projection and other points along the B-ring inner edge fill the entire central

ring system. Lying adjacently within the B ring the emissions comprise the region commonly designated the C ring. However, no inner edge exists to delineate a boundary between the C and D rings. For this particular sighting, therefore, the D ring must be considered non-existent. C and D rings have been observed in the past, and undoubtedly will continue to be observed in the future. This plate indicates that their occurrence is dependent upon electromagnetic vehicles in the ring system. Specifically, the rings are related to vehicle positioning and degree of emission activity.

Plates 17 through 22 demonstrate pointedly the massive power of electromagnetic vehicles. That this power can produce significant effects at extremely remote distances also is demonstrated. Additionally, two luminous sources, each about the size of earth's moon dramatize an apparently simple vehicular capability, albeit an awesome power in the accustomed framework of human beings. Alignment and positioning of vehicles on the left side of the ring system is found to be distinctly different from that on the right side. Yet, the narrow discontinuity band across the entire ring system is aligned quite in a straight line. Restated, several independent events acting in concert are required to create the linear, uniform-width discontinuity band across the tremendous span of chordwise opposite rings.

Ordinarily, only a single causative agent is dominantly responsible for an event. Here, however, at least 7 powerful agents of like kind are involved. In this situation, intelligent coordination would appear to be a more reasonable presumption than a chance occurrence of numerous simultaneous events. Even were the band caused by a single exceptionally large unit, the discontinuity band can be regarded as something of a big show. After all, the band is not at all a prevalent feature of the Saturnian ring system. Indeed, attention paid here may be the first directed specifically to this phenomenon. Viewed then as a rare show of power, the uniquely colorful band probably holds the distinction of having been constructed deliberately. This likelihood is enhanced by the finding that the A and B rings, in fact, are constructed. Formation of the cross-system band and generation of the A and B rings both imply that indigenous to electromagnetic vehicles is a portentous controlling power.

CHAPTER 6

Luminoids

With the single exception of the F ring, each of Saturn's rings exhibits great breadth. In comparison with the other rings, the F ring is but a narrow trace. Uniquely circumscribing the A ring, this disparate ring commands curious attention in terms of its properties and origin.

Some understanding of the F ring is afforded by the next four plates, 23 through 26. Introductory Plate 23 shows a non-uniformly luminescent F ring in positional relation to A-ring components and shepherding satellite. Specifically, the A-ring components are the inner and outer Enke rings and the separating Enke gap. Separating the F ring and the A-ring outer edge is a distance of about 3700 km (2300 mi), labeled (d). Distance (d) is nearly the same as the width, (w), of the outer-Enke A ring (3200 km or 2000 mi). In terms of earth traverses,
(d) and (w) are roughly the same distance as an airline flight between Washington, D.C. and Los Angeles, California.

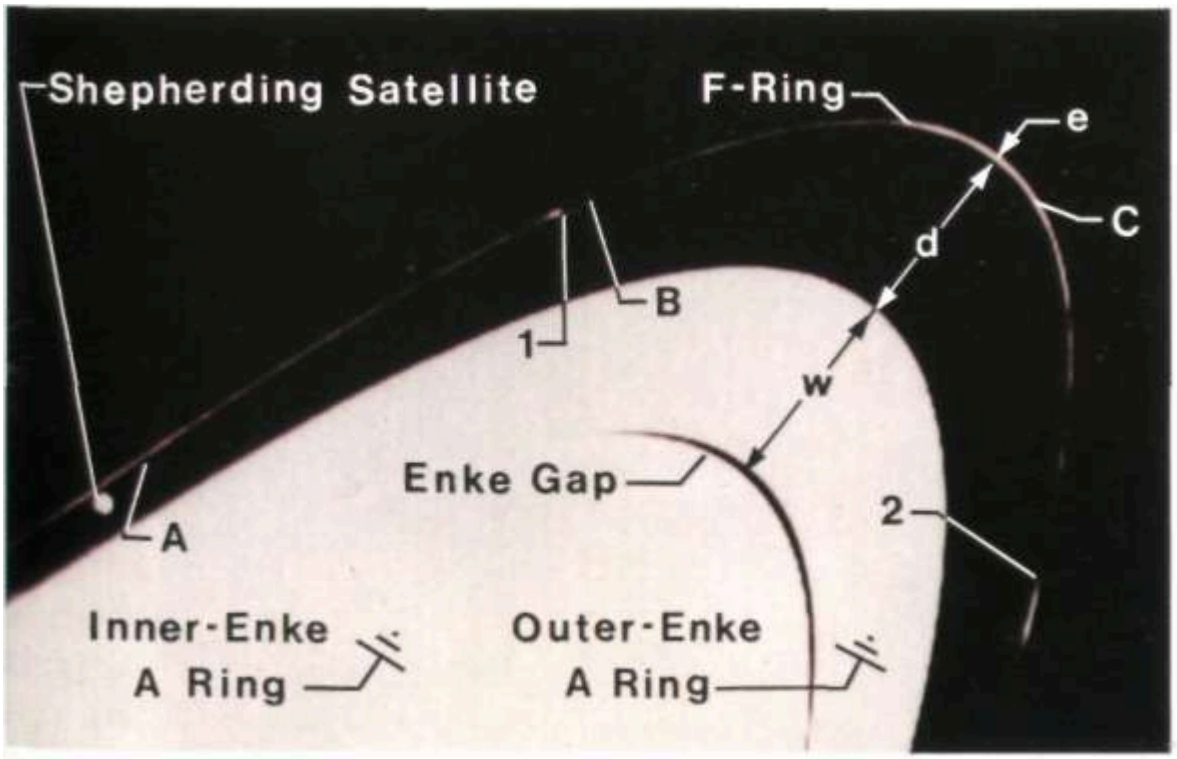


Plate 23*: Non-uniformly luminescent F-ring in positional relation to A-ring components and a shepherding satellite.*

Breadth of the F ring, (e), is about 70 to 100 km (40 to 60 mi), or about 1/3 the Enke-gap width. At the left, a shepherding satellite marks a segment, A, of the F ring having pronounced luminosity. Around the ring to the right of A, luminosity fades gradually until the ring is punctuated with a short, bright, widened segment left of (1). Right of (1), a break in the ring occurs at B. Following this break, a pattern of variable luminosity continues along the ring to the right. Maximum brightness is achieved at the segment labeled C, even though a shepherding satellite is not present and the ring is discontinuous. Therefore, some sort of excitation mechanism exists, other than shepherding satellites, to produce variable luminosity along the F ring.

To learn about the origin of the F-ring luminosity, the regions labeled (1) and (2) in Plate 23 have been examined. Plate 24 depicts segments of the F ring close-up showing that luminosity derives from emissively active core material. Part (a) presents a segment at region (1) and part (b) shows a segment at region (2). At region (1), the finite segment has a clumpy, but untwisted core. In contrast, the continuously tapered segment at region (2)

has a helical core as though composed of two or more entwined strands. Both regions exhibit stubby, luminous emission jets. Some of the emissions act collectively to produce areas of intense brightness, or incandescence. Plates 24(a) and (b) disclose that the F ring consists of a high-energy train of material, neither everywhere continuous nor everywhere of uniform cross section. This type of irregularly-shaped emissive material, for convenience, shall be referred to subsequently as luminoids.

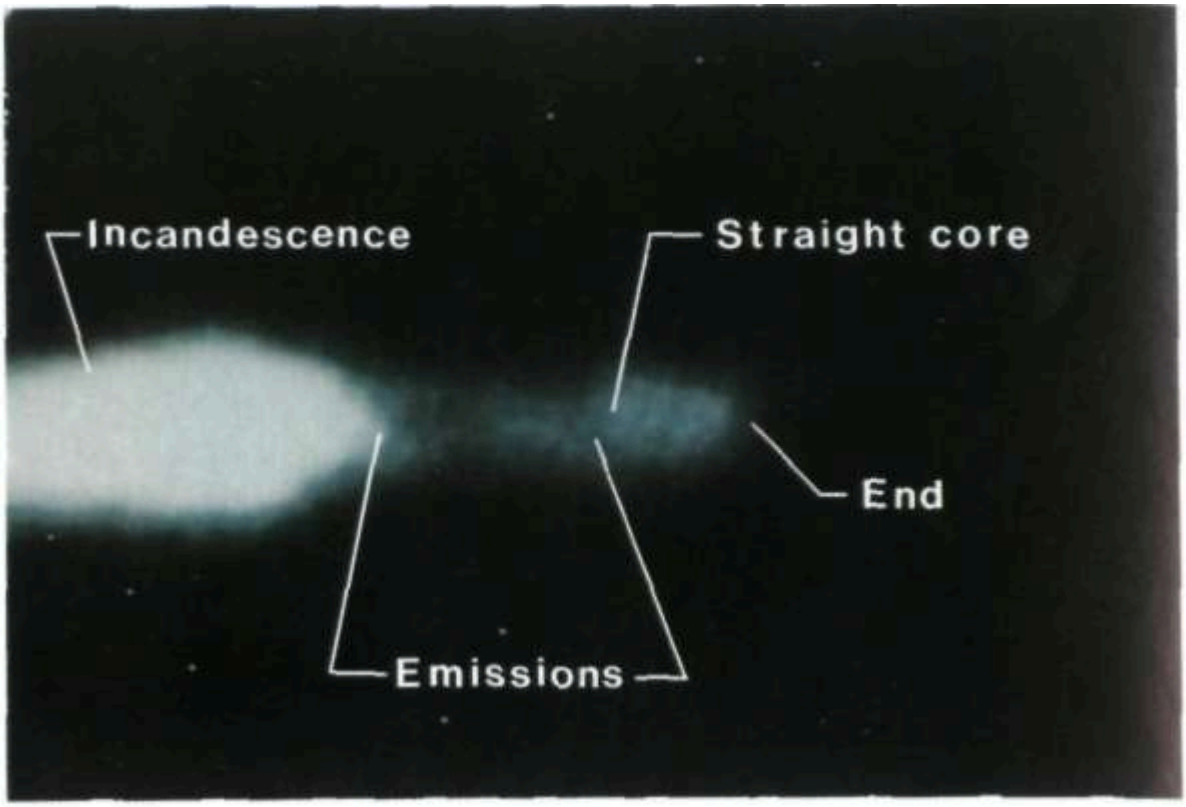


***Plate 24a**: Segments of F-ring close-up showing that luminosity derives from emissively active core material.*

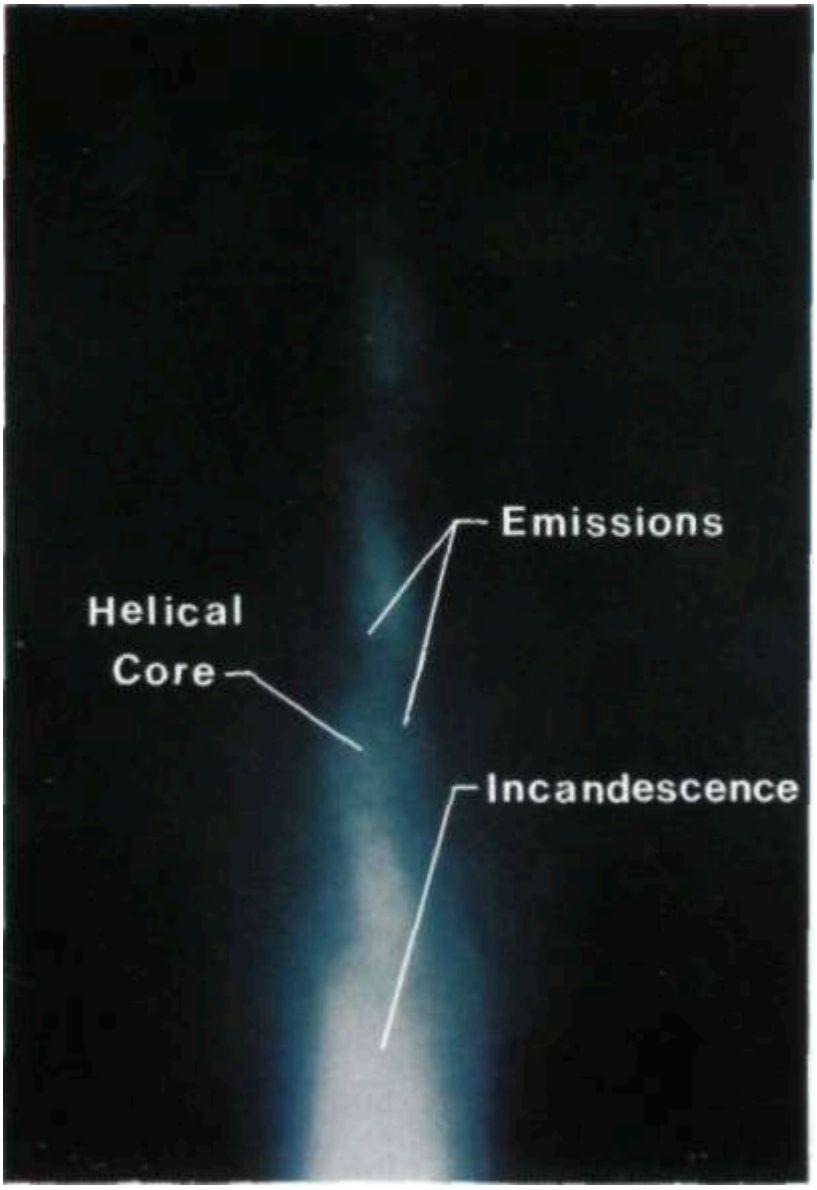


***Plate 24b**: Region (2), Plate 23*

An external energy supply would seem to be required to sustain the high level of luminous output of the luminoids. That at least part of this energy might be supplied by the A ring is disclosed in Plate 25. Plate 25 presents the non-uniformly luminescent F ring of Plate 23 exposed to reveal interconnections between the F ring and the A-ring outer edge. While numerous inter-ring connections are present, two of the more distinct ones are pointed out in a region along the A-ring outer edge where filaments cross. Edge filaments are a product of various electromagnetic vehicle outputs which, as already has been found, extend throughout the ring

system. Functional compatibility of the A and F rings leads to a realization that the F ring is not an isolated entity. Rather, the F ring is an integral formation in the overall ring system.

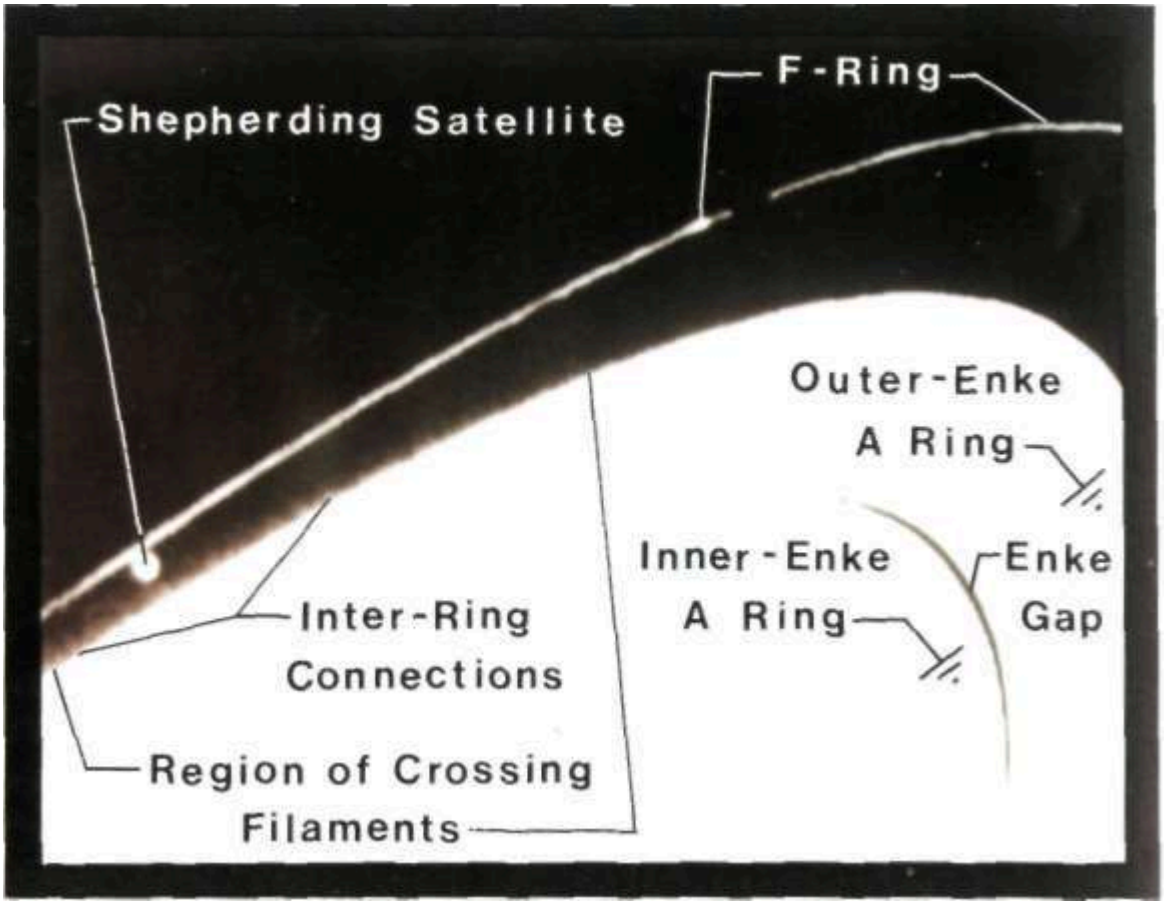


***Plate 25**: Non-uniformly luminescent F-ring of Plate 23 exposed to reveal inter-connections between the F-ring and A-ring outer edge.*

An F-ring photograph, printed popularly in publications to illustrate the phenomenon of braiding, supports the concept that the ring indeed is vehicle related. Braiding being the extraordinary phenomenon focused upon, concern has not been directed heretofore toward possible existence of other, importantly coupled information. A photograph of this braided F ring, exposed to bring out latent background information, is introduced in Plate 26.

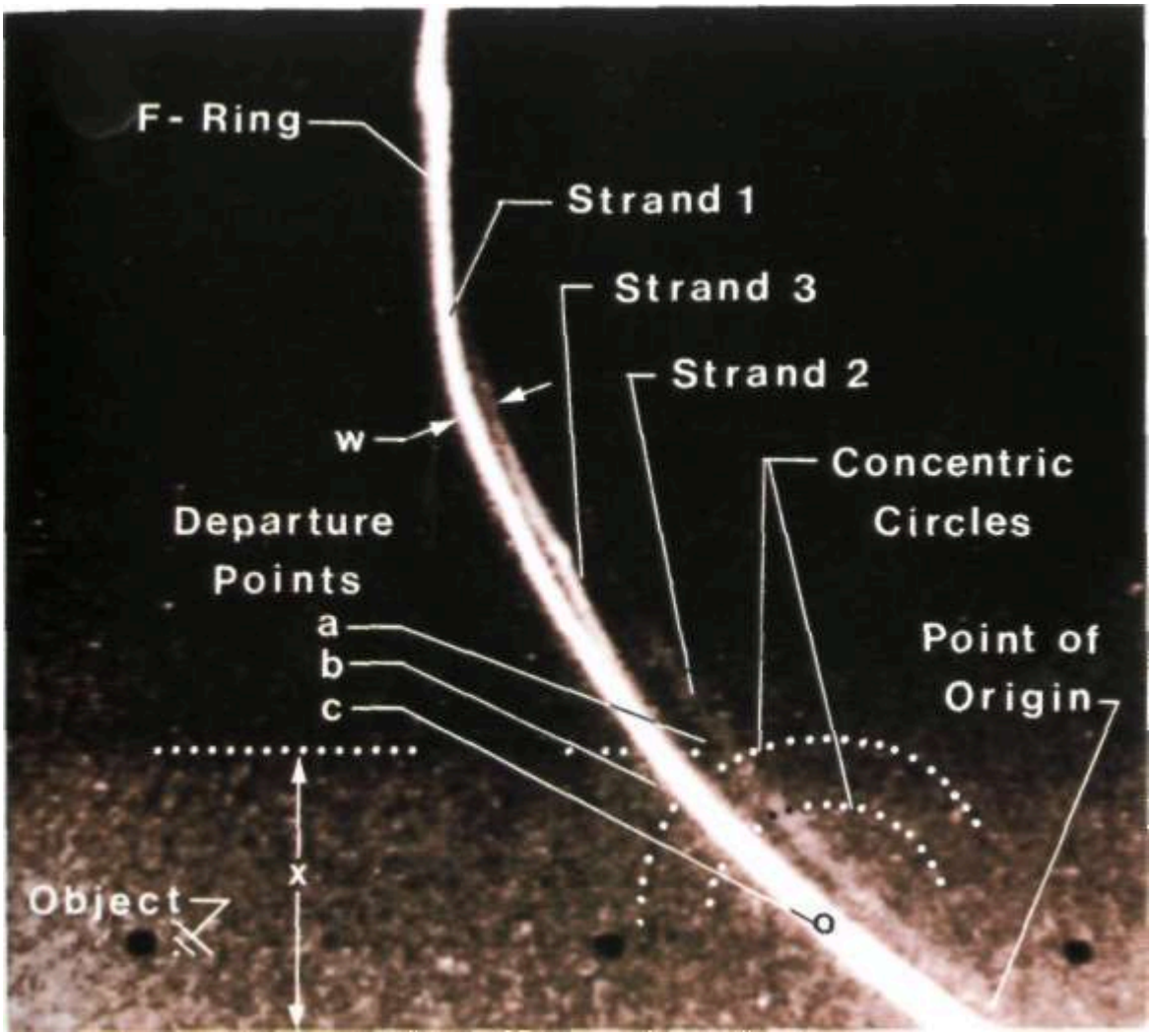


Plate 26*: Photograph of braided F-ring exposed to reveal a large coupled object.*

Plate 26 shows a braided F ring coupled together with a large object. That part of the object which lies within the picture extends completely across the frame, up to a height (x) from the bottom edge. A relatively light color, in contrast to the upper background, delineates the area just described. That the light area is in fact an object is assured by the presence of two concentric circles whose center, (o), lies on strand (l). These circles are indicative of a circulatory magnetic field around center (o). Additionally, surface patterns and shading suggest that the top horizontal element lies farther away than the element along the bottom edge.

Further, strand (2), is straighter above the surface-departure point, (a), than below it. The greater curvature of strand (2) between the point of origin and departure point (b) suggests a rounded surface. If this rounded surface is taken to be a circular profile, its radius would be about equal to the distance labeled (x). Half-diameter (x) is about seven times greater than the width, (w) of the F ring. When (w) is taken conservatively to be about 100 km (60 mi), diameter of the object would be 1400 km (870 mi), very nearly half the diameter estimated for the vehicle of Plate 5.

Strand (3) in Plate 26, when traced toward the object, is found to disappear behind (1) such that its surface departure-point occurs at point (b). Foreground strand (1) departs at (c), essentially at center (o) of the concentric circles. Spatial separation of the strand departure points sets up the initial condition which leads to braiding. Once departed, the strands tend to entwine owing to the inherent magnetic fields attendant with constituent luminoidal emissions. At least for the one case of Plate 26, luminoid strands originate from a very large, quiescent object. Knowledge of the specific luminoid source cannot be determined with a high degree of resolution because of paucity of data.

There are, however, several highly suspect vehicle components quite capable of producing the F-ring trail of luminoids. An obvious component is the nose section of a vehicle when protruding sufficiently beyond the A ring. While the nose section of a vehicle is somewhat more active compared with its rear section, activity near the nose could be quite sufficient to generate luminoids (Plates 7 and 8). Luminoids also might be generated from vehicular axial exhaust products, separately or in conjunction with tip matter from trailing body streamers. Moreover, this latter mechanism is compatible with activity between the F ring and the A-ring outer edge (Plate 25).

From the foregoing discussion, a tentative conclusion is drawn that components of orbiting electromagnetic vehicles generate the F-ring trail of luminoids. Because these vehicles can travel about and position themselves, a further conclusion is drawn. Luminoids might be expected to be found elsewhere in the Saturnian satellite system, albeit not necessarily active or in ring form.

CHAPTER 7

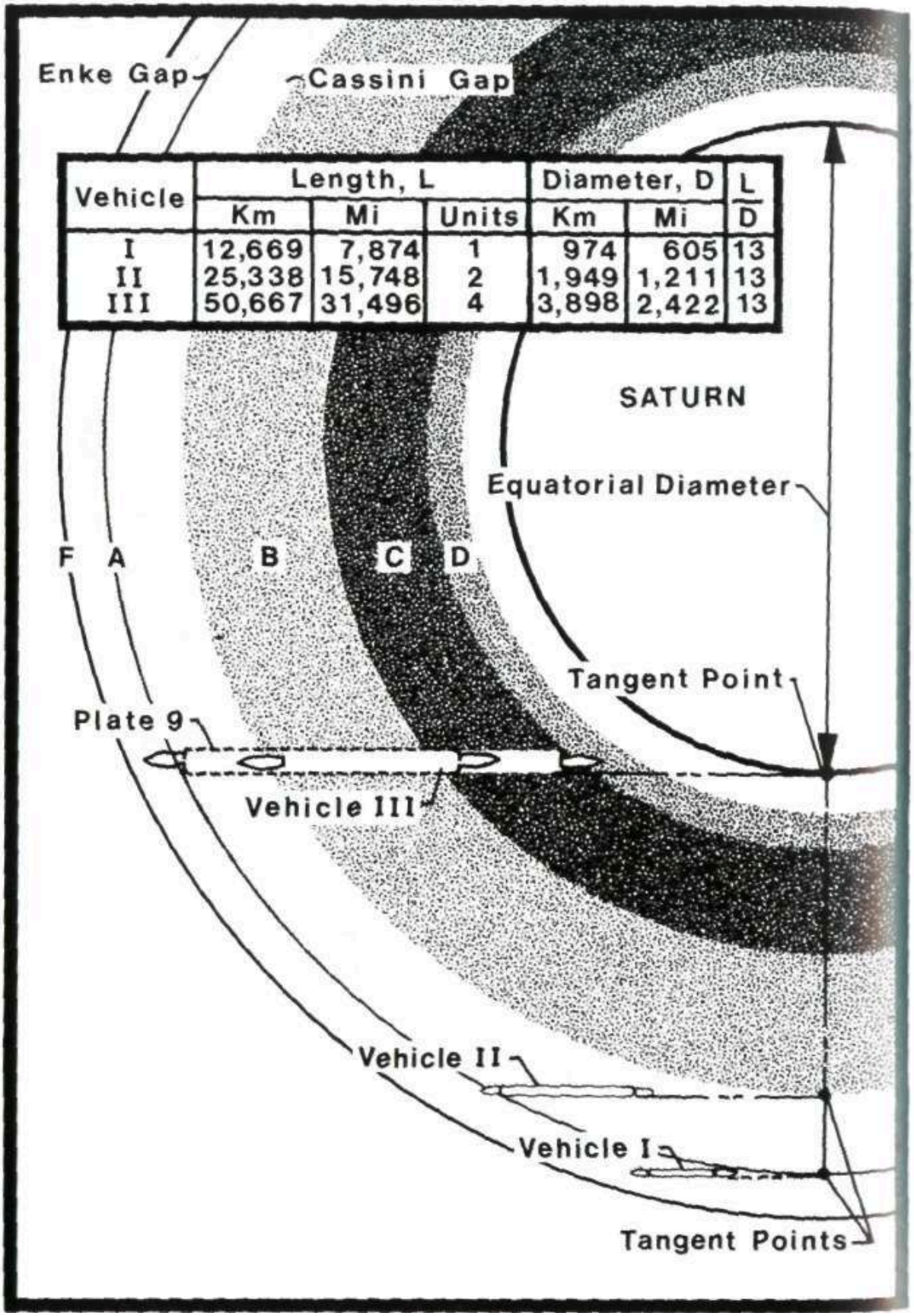
Vehicle Recognition

Evidence is 100 percent positive that propulsive vehicles generate the inner- and outer-Enke A rings of Saturn. Presence of these units is made fortuitously clear in Plates 5 through 8. Ordinarily, emissions are so profuse and chameleonic in character that recognition is rendered quite difficult. Recognition also is hindered by different modes of vehicle operation which produce strangely diverse appearances. In absolute size, these mobile bodies are unearthly large. However, in terms of typical Voyager photographic fields of view, frontal body images are close to being imperceptibly small. Feature recognition, therefore, is in part a developed skill of geometric perception in relation to surroundings. Cognitive skill is deterred when one has never performed the exercise of examining and correlating numerous photographs. Lest this deterrent have caused difficulty in relating to reality of size, this chapter shall approach earlier subject matter from a different viewpoint. Then, consideration will be given to two close-ups of Saturn which will provide information transitional to subsequent chapters.

Three distinctly different sizes of vehicle appear in Plates 5 through 9. The smallest generates the outer-Enke A ring and the next size larger generates the inner-Enke A ring. During ring formation, hot axial exhaust is directed into the Enke and Cassini gaps tending to clear them of matter. The largest of the three vehicles is long enough to extend almost across both the A and the B rings (Plate 9). Ratio of length to diameter for all is in the neighborhood of 13 to 1. Given the premise that the small and intermediate units together generate the A ring, a fair inference is that a single larger vehicle similarly might generate the B and C rings. A single vehicle is inferred because no gap exists between the B and C rings. If these observations really are true, then it follows that ring size must be a fairly good measure of vehicle size.

That, indeed, ring and vehicle size are related intimately is illustrated by Plate 27. In the figure are shown three fineness-ratio 13 vehicles having multiple unit sizes of 1, 2 and 4. These sizes closely satisfy the Planar dimensional requirements for forming the A, B and C rings. In the polar

view shown in the figure, the bottom element of each vehicle is a line, which, when extended, perpendicularly intersects an extended Saturnian equatorial diameter. Intersections of these line pairs mark points of tangency of the vehicle body-element lines (extended) with respect to ring-gap boundaries. For example, the tangent point for Vehicle I is at the Enke gap; for Vehicle II, it is at the Cassini gap; and for Vehicle III, it is at the surface of Saturn.



Vehicle	Length, L			Diameter, D		L/D
	Km	Mi	Units	Km	Mi	
I	12,669	7,874	1	974	605	13
II	25,338	15,748	2	1,949	1,211	13
III	50,667	31,496	4	3,898	2,422	13

***Plate 27**: Three fineness-ratio 13 vehicles having multiple unit sizes of 1, 2 and 4 closely satisfy the planar dimensional requirements for forming the A, B, C and D Saturnian rings. View is perpendicular to the ring plane.*

Vehicle sizes I, II and III fairly accurately portray the vehicles to the scale revealed by Plates 5 through 9. Vehicles I and II are seen in Plates 5 through 8 at about the same relative location with respect to the rings as shown in figure 27. Vehicle III in Plate 9 assumes a position across the A and B rings more like that depicted by the dashed lines in the figure. When 12,669 km (7874 mi) is taken as the unit length, Vehicle II is twice the size of I; and Vehicle III is twice the size of II. Vehicle lengths in terms of Earth's equatorial diameter are 0.99, 1.99 and 3.97, respectively. Even Vehicle I, the smallest, is large in that its length is almost the same as Earth's diameter. Vehicle III is much more immense. A circular disc having the same cross-sectional area as Vehicle III would cover the United States coast-to-coast, and extend from the south-western shore of Hudson Bay, Canada to Matzalan, Mexico. Intermediate-size Vehicle II (1949 km diameter) has a frontal area which compares favorably with the size of Saturnian satellite Iapetus(1460 km).

Other basic cognitive features concern the countenance presented by a vehicle as it orbitally moves around Saturn. Plate 28 shows a simplified electromagnetic vehicle in different attitude angles at two positions during formation of the inner-Enke A ring. These two positions are labeled (1) and (2). In position (1), the vehicle presents side and bottom profiles in polar and equatorial views, respectively. In the polar view shown, the vehicle assumes a skew angle of 15 degrees. Vertex of this skew angle lies on the bottom longitudinal body element at the furthermost point forward.

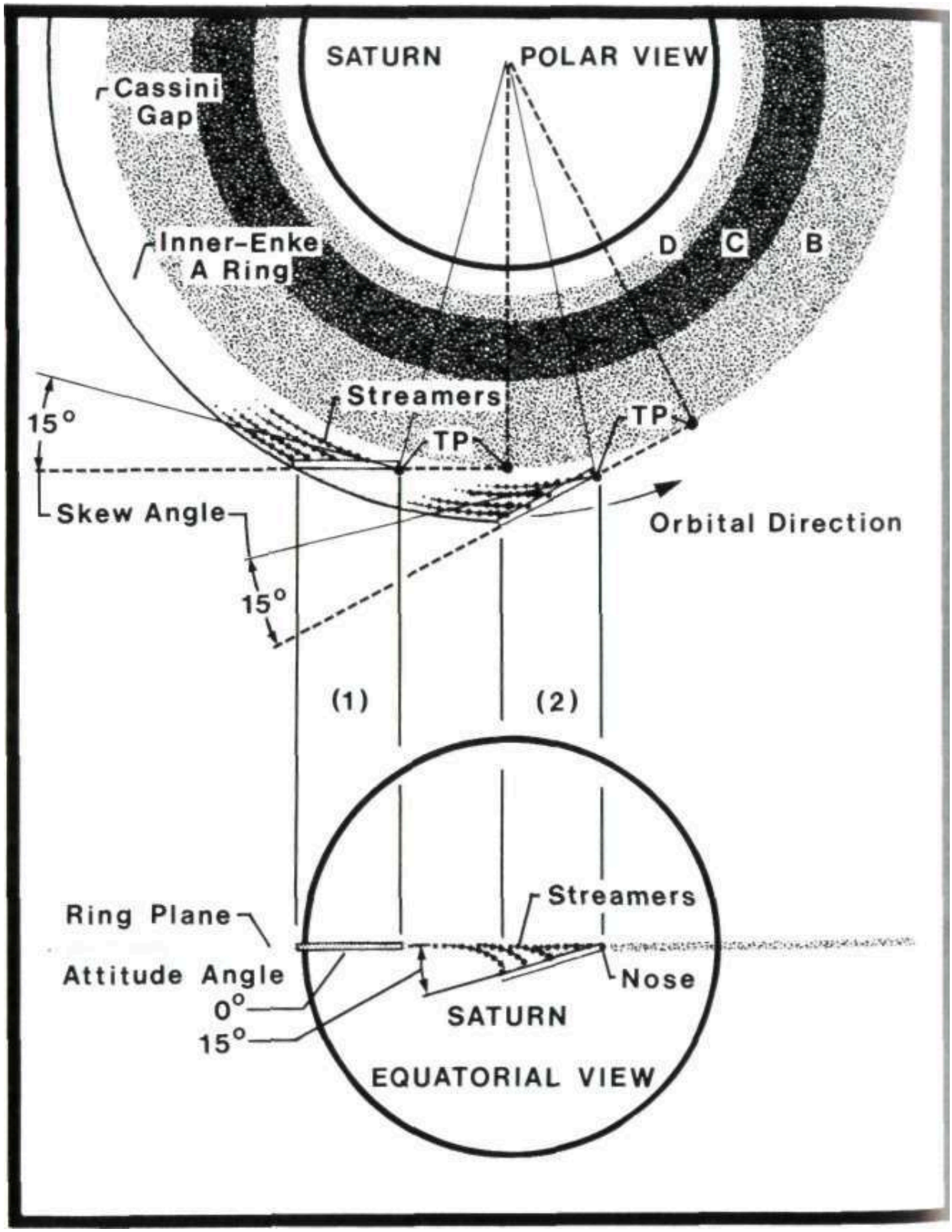


***Plate 28**: A simplified electromagnetic vehicle in different attitude angles for two orbital positions during formation of the inner-Enke A-ring.*

The skew angle is formed by two lines which pass through the vertex: one line is the bottom element whose extension is tangent to the inner adjacent ring and also perpendicular to a Saturn radius extended to the point of tangency (dashed lines); the other line is tangent at the vertex to the inner ring being formed as well as perpendicular to a Saturn radius drawn to the vertex (solid lines). In effect, the initial angle at which a leading-edge nose streamer trails back over the body of the orbiting vehicle is equal to the skew angle. To maintain constant width of the inner-Enke A ring, then, a vehicle must continue in orbit holding a constant 15-degree skew angle. A larger skew angle implies a wider ring. Thus, differing measurements by various observers for inner- and outer-Enke A ring widths can be accounted for by variation in skew angle by these ring-forming vehicles.

In position (2), the vehicle presents top and side profiles in the polar and equatorial views, respectively. Again, the same 15-degree skew angle is shown as for position (1), but orientation of the streamers with respect to the ring plane has been changed. Instead of the streamers being placed in the ring plane when the vehicle is in an attitude of zero degrees with respect to the ring plane, the streamers are now placed there with a different body attitude. To attain this condition, the vehicle first must be rolled clockwise 90 degrees. In this position, the streamers shoot up and out of the ring plane. To get them back in, the tail end must be lowered so that the body is inclined 15 degrees to the ring plane. When this is done, streamers are made to flow into the ring plane.

Vehicle countenance in flight attitudes portrayed by positions (1) and (2) poses different identity situations. For example in flight attitude (1), a vehicle virtually would be unrecognizable when following in the dense wake of another. However, when a new ring is being formed, in a polar-oriented view the ring will assume a cut-off appearance commensurate with the orbital skew angle. Thereby, identity readily is established. For either of these two situations, Plate 28 illustrates that an equatorial view alone will provide little cognitive assistance. In flight attitude (2), vehicle presence is fairly easy to establish. The reason is that the nose protrudes slightly beyond the location of the furthest-forward trailing streamer. Though little of the body can be seen in a top view, a partial revelation does not mean that the rest is not there. In the equatorial view of Plate 28, a vehicle exhibits a large

profile when in the attitude of position (2). Therefore, one could think that detection might be easy. Unfortunately, cloudiness from lateral body emissions tends to hide everything. Nonetheless, mere identity of a single recurring feature, such as the nose, may lead to observation of other new features and modes of operation.

Possible new features and modes of operation are offered for consideration in Plates 29 and 30. Both plates contain close-ups of Saturn, and attract attention mainly because of their being dramatically colorful. Order in the color patterns prompts examination for potential latent information. In Plate 29, a dark-blue latitudinal stripe in Saturn's atmosphere emanates from an object identifiable as a probable electromagnetic vehicle component. Located at the upper left edge of the picture, this object is found surrounded by an azure-blue glow. Emission character, shape and positional attitude suggest the presence of an electromagnetic vehicle, only the extreme end of which is observable. Atop the object, stubby emissions point outward at angles slightly different from one another. These different pointing angles impute an underlying curved surface. Surface curvature further is confirmed by a circular orifice which appears elliptical because of being viewed sideways as well as frontally.

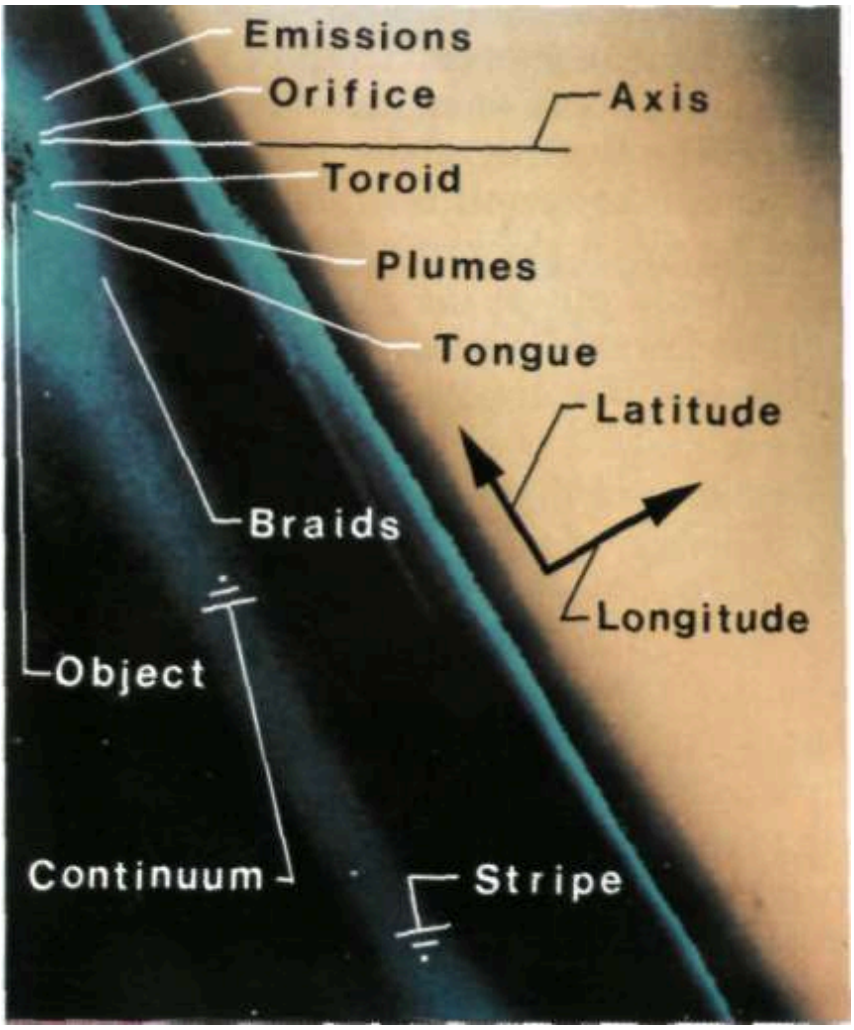


***Plate 29**: A dark blue latitudinal stripe in Saturn's atmosphere emanates from an object identifiable as a probable electromagnetic vehicle component.*

Between the orifice and stubby emissions, a section transitional to a larger body diameter is consistent with diverse emission pointing angles. A small toroid located at the base of the exhaust orifice attests to the electromagnetic character of the immediate locality. Below the toroid and orifice, a hose-like appendage or tongue projects longitudinally. Adjacent to the toroid, two arched azure-blue plumes are emitted from the tongue surface. These plumes contribute to the regional glow. Further down, plume generation becomes quite profuse and enlarges the glow. At the edge of the azureblue region, plumes can be seen to braid and knit themselves into a tight mass. This mass, which forms a long continuum of the tongue, appears as a stripe in Saturn's outer atmosphere. The stripe is placed longitudinally whereas the body's

longitudinal axis is displaced considerably from the latitudinal. Attitude adjustment to accommodate placement of exiting matter is typical for electromagnetic vehicles (Plates 18 and 28). Indications are that the object pictured probably is the exposed nose of an electromagnetic vehicle.

A second close-up of Saturn containing surprisingly important information is the frontispiece, reprinted as Plate 30. Plate 30 reveals salient features of an operational electromagnetic vehicle. A component, (1), is identifiable readily as the nose orifice. Extending from below the orifice is a long, tightly twisted tongue, (2) The top longitudinal-profile body element, (3), is perceptible for a short distance aft of the nose. Location of the bottom longitudinal-profile body element is obscured inasmuch as a solid band of under-body emissions, (4), exhausts where this element otherwise would appear. The distance between these two locations establishes an approximate body diameter, (5), and permits estimation of trailing-end location.

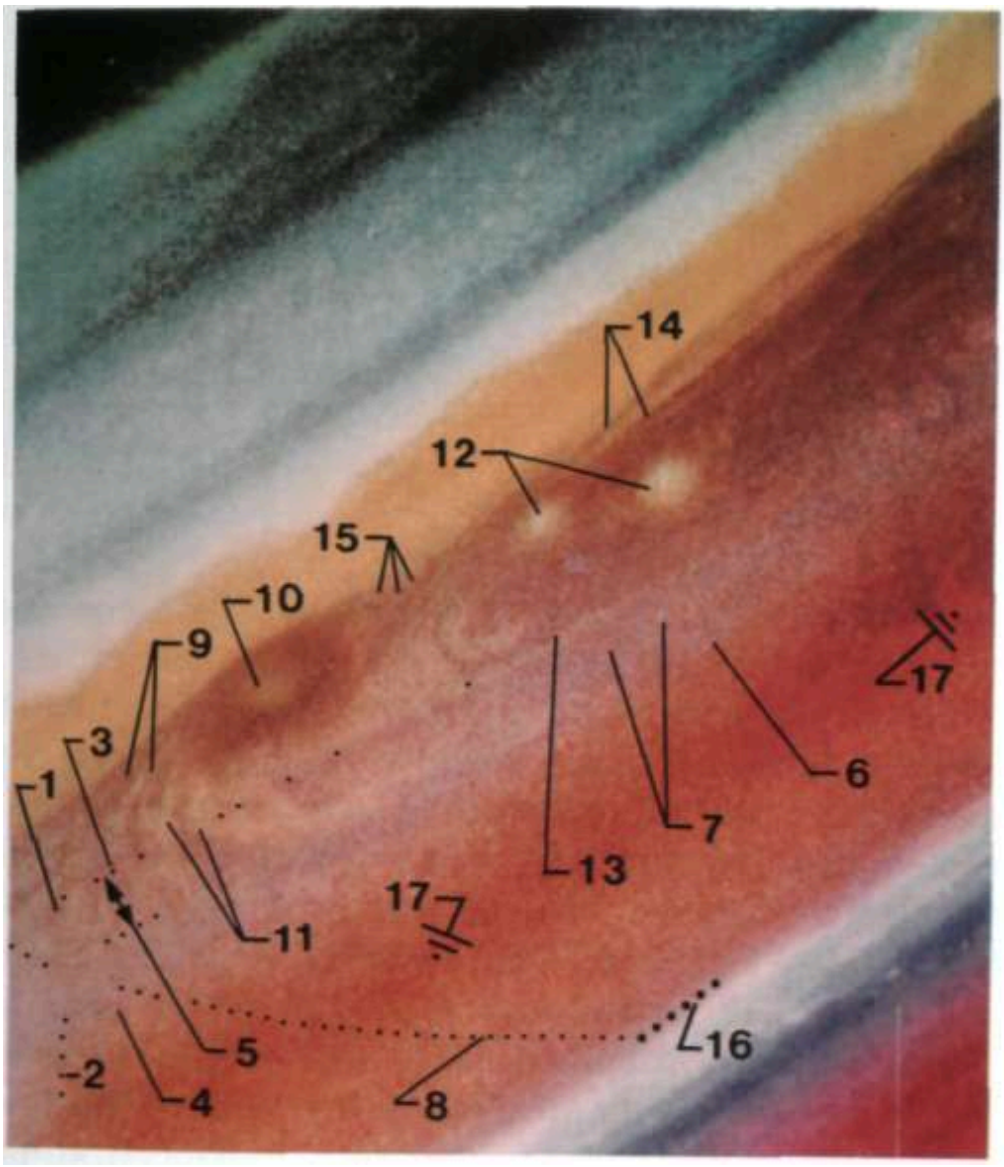


***Plate 30**: Salient features of an operational electromagnetic vehicle. 1. Nose orifice; 2. Tongue; 3. Top body element; 4. Underbody emissions; 5. Body diameter; 6. Trailing end; 7. Body-attached streamers; 8. Bi-lateral projection; 9. Branch streamers; 10. Annulus; 11. Secondary streamers; 12. Luminous sources; 13. Braided roll; 14. Outer streamers; 15. Nodules; 16. Terminal emissions; 17. Wake*

When a 13 to 1 fineness ratio is used for length estimation, the trailing end, (6), lies just beyond the furthest aft body-attached streamer, (7). Back at the nose a bi-lateral projection, (8), can be identified extending on each side. Branch streamers, (9), rise from this projection and flow centrally to form a large overhead annulus, (10). Secondary streamers. (11), flow into this

annulus from in- and out-board of the body. Aft of the annulus two luminous sources, (12), are sustained above the body. These sources are components of a complicated network of filaments. Starting at the cylindrical body, filaments rise upward and form a long braided roll, (13). This roll, in turn, emits filaments which contribute to the luminous sources. Filaments exiting from the sources complete an electrical path upon termination at outer-boundary trailing streamers, (14). The electromagnetic character of these phenomena is affirmed by presence of nodules, (15), on streamers just aft of the annulus. These nodules, being visual properties of pinched plasmas, are indicative of electromagnetic interactions.

Determination of absolute size is precluded because of uncertainty in reference-dimension accuracy. However, a body length equal to one earth diameter can be assumed per findings of Plate 27. For this situation, the annulus outside diameter is about equal to the diameter of Earth's moon; and the luminous-source diameters are about 1/3 this size. Length of body lateral projections appear to reach at least a body length, if not farther. The projections in the picture extend outboard such that their terminal emissions, (16), form a well-defined latitude boundary on Saturn. Between the body and terminal emissions, body projections leave wakes of matter, (17), along their entire lengths. Literally, rivers of electrically charged matter flow from the entire body and affect vast areas. By any worldly standard, this display of organized power is profoundly awesome.

Plate 30 has afforded an opportunity to discuss properties of an operational electromagnetic vehicle, but only generally. Now, the front-end section will be addressed specifically to emphasize detail. Accordingly, Plate 31 introduces a rendering of the front-end appearance of the electromagnetic body pictured in Plate 30. In the order discussed, the following are labeled for ready identification: (1) cylindrical body; (2) axial exhaust; (3) bi-lateral projection; (4) underbody emissions; (5) nose tongue; (6) nose trailing streamer; (7) branch trailing streamer; (8) body trailing streamers; (9) nose peripheral emissions; and (10) streamer collector.

Plate 31*: Front-end appearance of an electromagnetic vehicle as rendered from Plate 30.*
1. Cylindrical body; 2. Axial exhaust; 3. Bi-lateral projection; 4. Underbody emissions; 5. Nose tongue; 6. Nose trailing streamers; 7. Branch trailing streamer; 8. Body trailing streamer; 9. Nose peripheral emissions; 10. Streamer collector

A cylindrical body, (1), emits a faint axial exhaust flame, (2), of probable extremely high temperature. Diameter of the exhaust orifice is about 1/2 body diameter. Aft of the nose about a body-diameter distant is located a bi-

lateral projection, (3). This projection might be likened to wings on an airplane. Below the projection is positioned a lengthy bank of under-body emissions or flame jets, (4). In frontal view, these jets would extend radially outward from beneath the body at a probable angle of about 45 degrees. Immersed in, but extending out of, the flame bank is a tightly entwined tongue, (5). The length of the tongue is at least 2 body diameters and has capability within itself to project emissions or plumes. Atop the body nose just aft of the axial exhaust flame, a bulbar pinched streamer, (6), flows upward and aft.

Other streamers, (7) and (8), also flow aft. Streamer (8) starts at the body; but streamer (7) commences from a lateral projection. Streamer (6) shows an ability to branch directly forward. At the nose ahead of the foreground lateral projection, a small jet (9), is emitted which jumps or "shorts" to the projection. This phenomenon illustrates the presence of different electrical potential (voltage) levels and demonstrates the mechanism that governs flow paths. Also in this same vicinity, numerous small radial emissions occur around the exhaust cowl. The hub labeled (10) acts as a collector to coalesce beginning streamers. Coalescence forms an embryonic streamer which ultimately bursts forth.

In this chapter, cylindrical propulsive bodies of approximate fineness ratio 13 have been pictured with lengths ranging from 1 to 4 earth diameters. The bodies and lateral projections spew matter at elevated temperature and high electrical potential in an orderly, understandable manner. Because of the natural propensity for emissions to seek the least path of resistance to attain a lower potential, all objects having a lower relative potential are subject to electromagnetic inter-action in some degree. How influential it is, of course, depends upon the distance between the electromagnetic components and the object.

Clearly, hot parts of a vehicle could leave imprints on large solid objects, as though branded. Saturn's rings exhibit some of the many residual forms which ejected matter can take. Because of their mobility, vehicles can be expected to appear almost anywhere. A signature of former presence would be unique, solidified objects of appreciable size and differing shapes. Ejecta of different colors equate to different substances, or compounds. Interestingly, water in vapor, liquid or solid state most likely is a major and

prolific exhaust product. This assertion is based upon indications that Saturn's great rings are composed of water ice. Vastness of range in vehicular capability further is indicated by large-scale formation and huge, sustentative luminous sources.

PART III

OUTLYING BASTIONS

CHAPTER 8

Dione Gives Up a Big Secret

Saturn has revealed itself as an inconspicuous habitat for ultrapowerful machines. Machines always have a purpose. All require inputs. Then by an intermediate process, all yield outputs. Outputs consist not only of the intended products or services but also of refuse. As the Saturnian ring system so well illustrates, refuse can be seen much more readily than the producing sources. Dione also falls into this same pattern.

On Dione, a luminescently active landscape can be identified. Plate 32 shows this topographical activity. Specifically, over about 250 km (150 mi) of its landscape near the horizon, Dione displays a narrow, hazy-white elevated-surface band, (1), profusely emitting blue ejecta, (2). This illuminated band appears to rise above the plain topography in the foreground by nominally 7 km (4 1/2 mi).

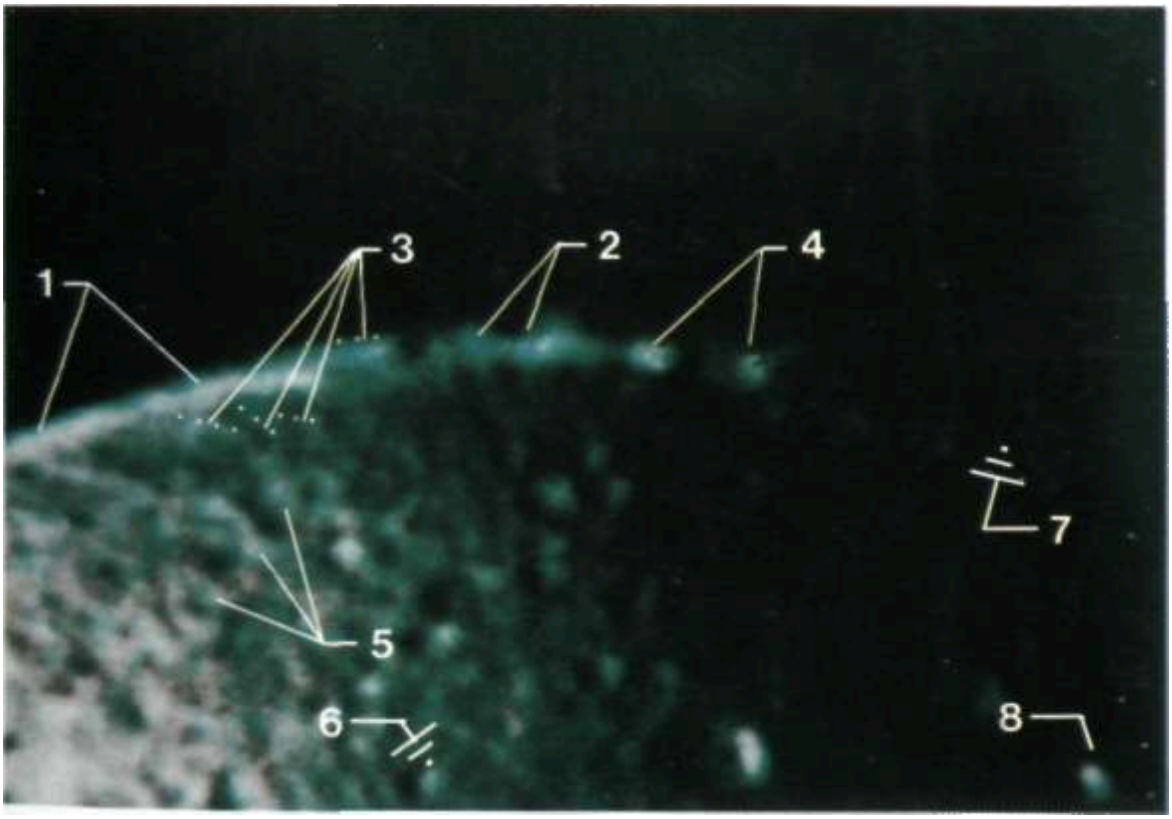


***Plate 32**: Luminescently active landscape on Dione.*
1. Elevated-surface band; 2. Blue ejecta; 3. Cylindrical shapes; 4. Angular shapes; 5. Large lumps; 6. Penumbra; 7. Umbra; 8. Colored illumination

One part of the band consists of shapes approximating cylinders, (3), staggered in position abreast and crosswise of one another. Another part contains angular shapes, (4). Foreground topography appears to consist of the same substance as the elevated band. However, emissions are not so pronounced; and the surface presents softer contours as though large lumps, (5), had fused together while in a malleable state.

Beyond the penumbra,* (6), well into the umbra, (7), where a solid shadow should occur, a spot of multi-colored illumination, (8), appears. In this completely shadowed region, the wall side of any crater is too low to intercept sunlight and cause reflection. Inferentially, the active topographical area stretches afar. A conservative estimate is 73,000 square kilometers (28,000 sq mi). In comparison, terrestrial topographical coverage of naturally illuminated areas is miniscule. Further, the diameter of Dione is only about 1/11 that of earth. Clearly, the luminescent phenomenon on Dione has no earthly counterpart. Subsequent considerations substantiate this observation.

**A region partially illuminated by the sun.*

To investigate landscape detail, a microphotograph has been made of Dione's narrow-band illuminated topography. This photograph, Plate 33, discloses numerous emissions emanating from many irregularly-shaped surfaces. These emitting surfaces are similar to those characterizing matter in the F ring. This occurrence is puzzling in that Dione presents mostly a starkly barren face packed with craters.

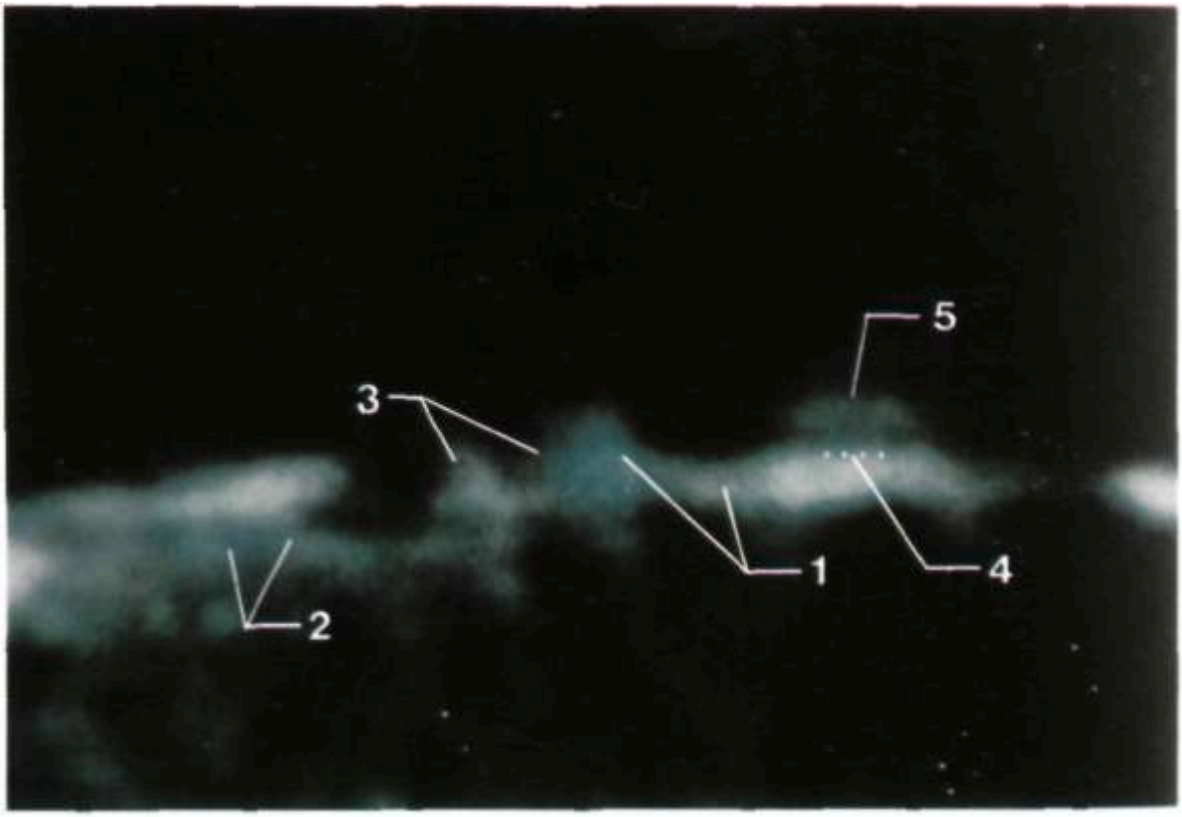


Plate 33*: Dione's narrow-band illuminated topography showing various types of emissions.*
1. Tree emission; 2. Re-entrant emission; 3. Toroid; 4. Lifting emission; 5. Floating body

Then, in sharp contrast, active material resembling an F-ring section appears on its periphery. Were this active material of volcanic origin, each emission would assume a parabolic trajectory as spewed matter gravitated toward Dione's surface. However, terrestrially familiar trajectory profiles do not occur. Instead, most emissions are like trees, (1), in that they simply terminate at some height above the surface. Others labeled re-entrant emissions, (2), connect with nearby objects.

A few uniquely distinguish themselves by forming classical electrodynamic toroids, (3). Still others act as lifting emissions, (4), to support an otherwise floating body, (5). Because of similarity with the F ring, Dione's elevated electromagnetic band raises doubt as to its being indigenous. Earlier considerations have indicated that the F ring results from products discharged by electromagnetic vehicles. Hence, there is rationale for

suspecting that the active material on Dione is not indigenous. Conceivably, appropriately positioned vehicles may
deposit the material. Further inquiry into this ambiguity is focused upon peripheral space adjacent to the circumferential surface of Dione. First, the narrow-band topography is probed for additional information. Then, a critical look is taken of a hemispherical sector of Dione which encompasses the same topography.

Presented in Plate 34 is Dione's narrow-band illuminated topography evidencing widespread emissive ectivity. This plate encompasses exactly the same field of view as preceding Plate 33. However, a longer exposure time has caused new images to emerge. Unfortunately, previously well-defined areas have turned white and lost detail from over exposure. Despite this difficulty, the floating body, (1), (labeled (5) in Plate 33), remains identifiable.

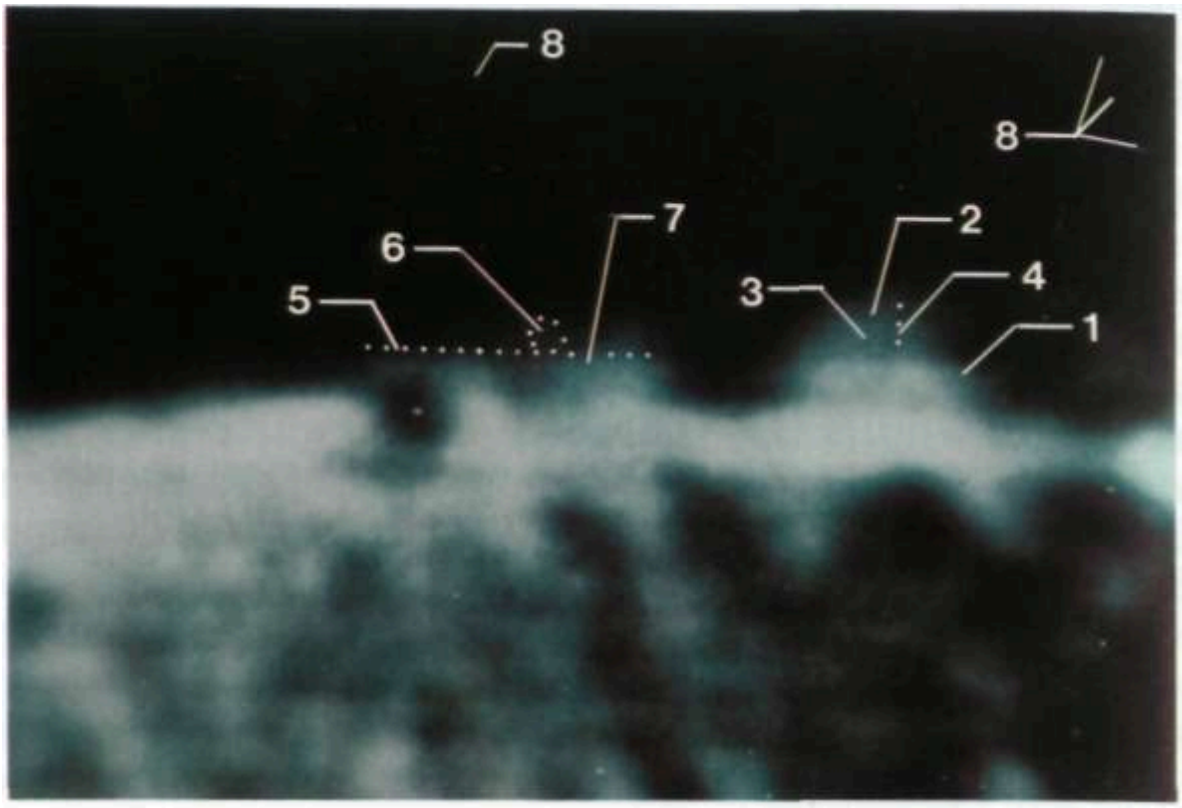


Plate 34*: Dione's narrow-band illuminated topography evidencing widespread emissive activity.*
1. Floating body; 2. Superstructure; 3. Toroid; 4. Electro-filament; 5. Cylindrical body; 6. Circular object; 7. Toroid; 8. Light marking

Above (1) is positioned a truncated pyramidal superstructure, (2) on the side of which a toroid, (3), is attached. An electro-filament, (4), extends from the side and reaches upward into space. Across the dark space to the left a cylindrical body, (5), having a ratio of span to diameter of about 8, is asymmetrically disposed about a circular object, (6). Another toroid, (7), is located just to the right of the circular object. These identifications raise a question of what lies hidden farther above the surface of Dione. Faint light markings, (8), indicate that other activity indeed does exist at a considerable distance away. Remote activity is incongruous with the concept that Dione's illumination is indigenous.

Suspicion is aroused that energy may be flowing into Dione inasmuch as the satellite can be regarded as being at low, or ground electrical potential. Nearby presence of an electromagnetic vehicle could supply the required energy. Evidence supporting this notion would be expected to embrace a large surface area. After all, vehicles have size superiority, and their ultra-high-energy projections span long distances.

Scant perspective of Dione's illuminated topography is provided by the micro-photographs of Plates 32 through 34. This constraint compels scrutiny of the macro-photograph which yielded the three micro-photos. Plate 35 presents macro-views of Dione showing curvilinear surface markings and duality in hemispherical lighting. Part (a) provides photographic identifications and part (b), pictorial interpretation aids.

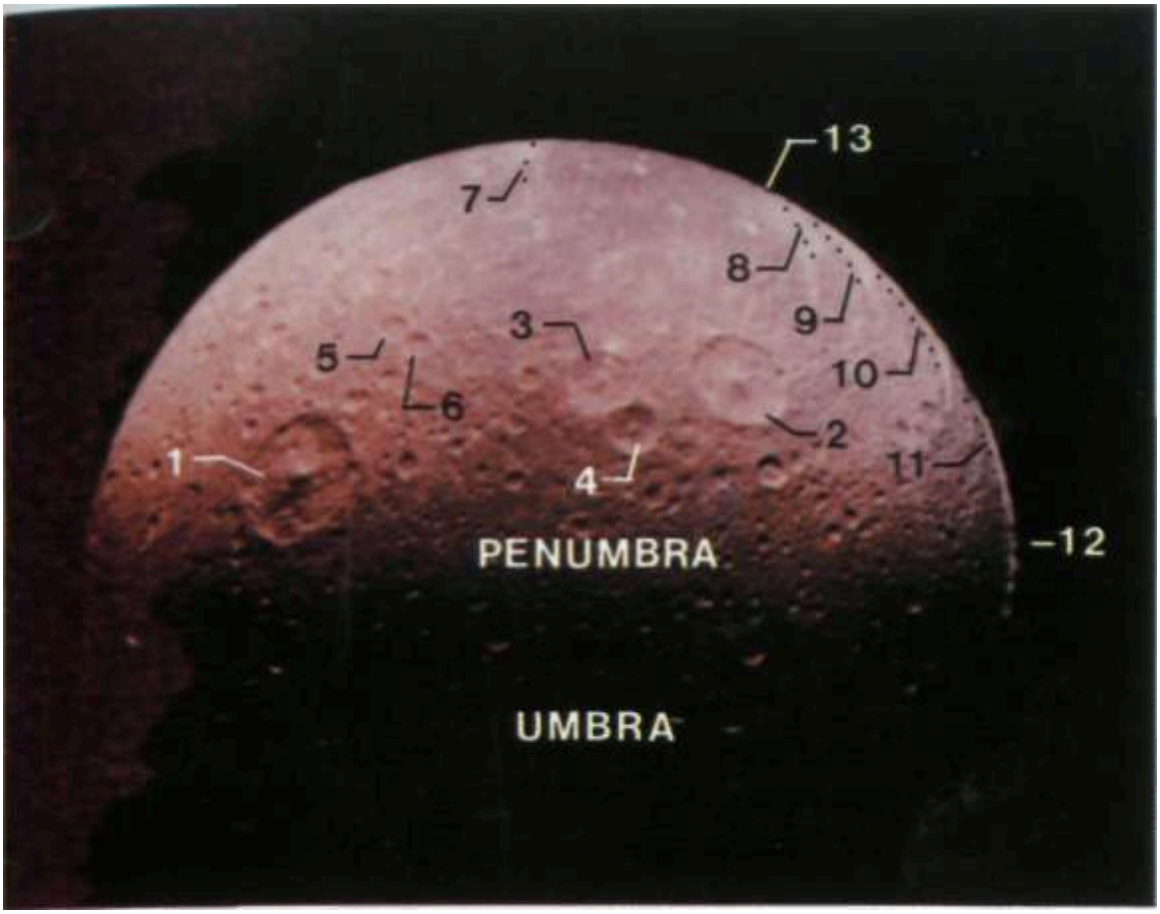
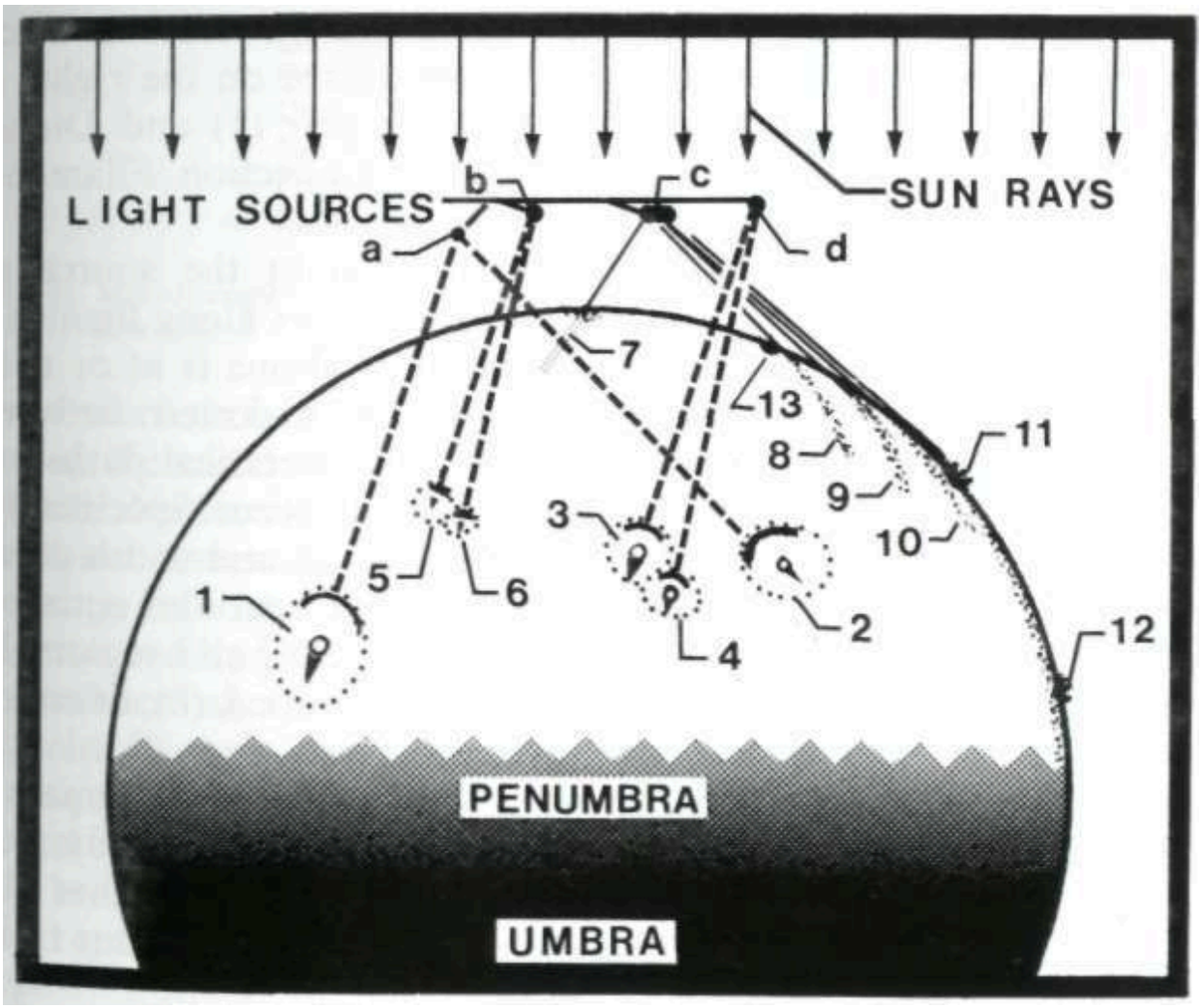


Plate 35*: Macro-views of Dione showing curvi-linear surface markings and duality in surface lighting.*
(a) Photographic identifications



(b) Pictorial interpretation aids
1. Aeneas; 2. Dido; 3. Romulus; 4. Remus; 5. Magus; 6. Latigus; 7, 8, 9, 10 and 11. Surface rays;
12 and 13. Blue emissions.

Some of the craters on Dione have been assigned names. Those to which reference will be made are, in part (a): (1) Aeneas; (2) Dido; (3) Romulus; (4) Remus; (5) Magus; and (6) Latigus. In the upper quadrant at the periphery, numerous rays curve inland from the moon's edge. These rays, numbered (7) through (11), comparatively are lighter in color than the surface. Blue emissions, (12), are the same ones presented in Plate 33. More blue emissions, (13), serve to unite these rays conceptually as a family.

Part (b) illustrates sun-ray orientation which causes the observed penumbra in part (a). In the sun-lit hemisphere, however, all shadows cast by terrain elevations are not aligned directionally with sun rays. Consistency in directional alignment should prevail when the sun is the only external source of light. In particular, craters (1) through (6) contain shadow orientations inconsistent with sun-ray direction. Dashed lines are drawn in the direction opposite the shadows to diagram probable spurious light paths. Intersection of line pairs suggests the possibility of nearby secondary light sources, (a), (b) and (c). Extrapolation of curved surface rays (7) through (11), indicated by solid lines, produces a companion common point, (d). These results tend to indicate that some sort of elongated source of light is positioned abreast of Dione.

To reveal details of the suspect region of Plate 35(b), resort has been made to a composite photograph. Its purpose is to capture all available surrounding spatial detail while preserving Dione's topographical clarity. This macro-scopic composite,* Plate 36, shows Dione amidst an impinging electromagnetic flow field. Readily identifiable is a luminescent filament pair, (1). These filaments generate a thick orthogonal filament, (2), which extends past Dione on the right. A central filament, (3), passes between filament pair (1) and Dione, continues around Dione and at (4), makes a Y-connection. Filaments (1) and (3) issue from a source at (5).

**For the composite, a detailed image of Dione has been superimposed on an overall (macroscopic) view exposed extensively to enhance background. Extensive exposure whitens and slightly enlarges the image of Dione. Upon over-laying the clear image on the white one, a narrow whiter border appears circumferentially.*

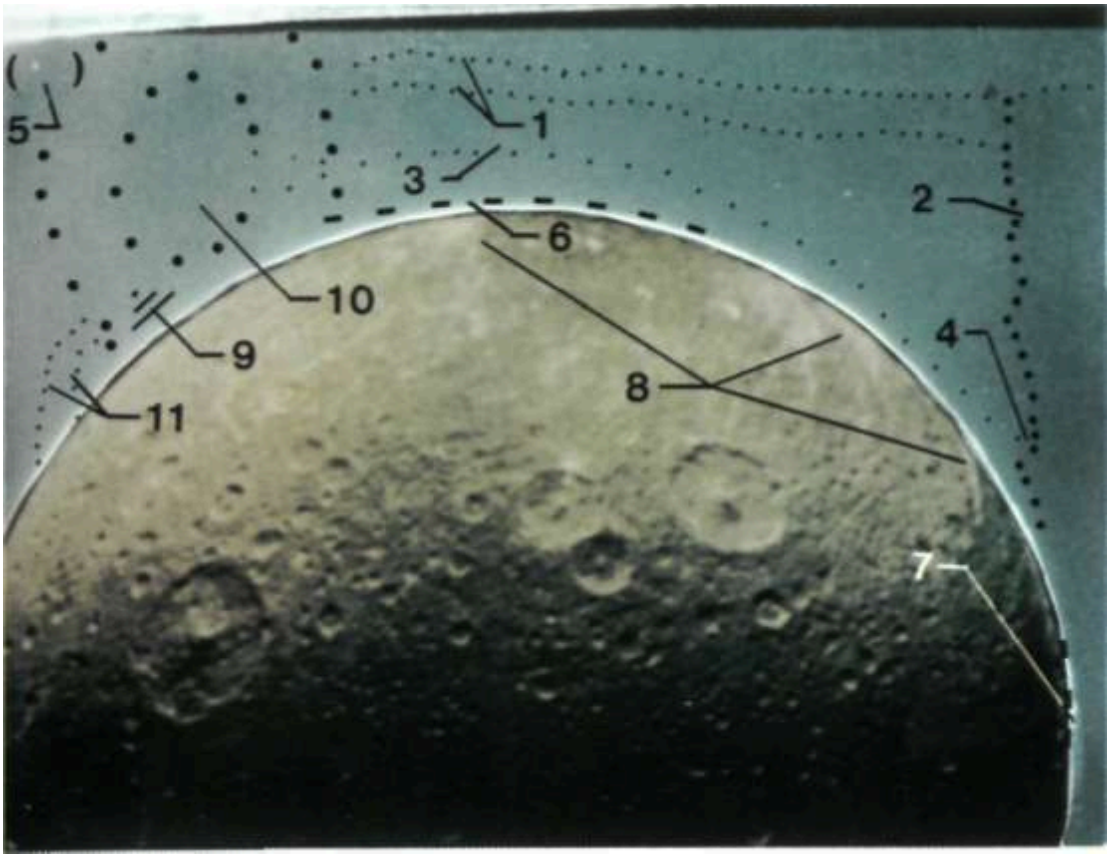


***Plate 36**: Macro-scopic composite view showing Dione amidst an impinging electromagnetic flow field.*
1. Filament pair; 2. Orthogonal filament; 3. Central filament; 4. Y-Connection; 5. Filament source; 6. Equatorial cross-flow; 7. Polar cross-flow; 8. Cross-flow extensions; 9. Opaque toroid; 10. Filament source; 11. Toroidal filaments

Highest electrical potentials, of course, exist at the source of filamentary emission. Diminution in potential occurs along filaments as distance from source increases. Inasmuch as Dione is at or near ground potential, cross-flow currents can be expected between filaments and surface. Locations having shortest electrical paths are where the cross-flow phenomenon most readily can occur. Specifically, two such places at the horizon are the equatorial and south-polar regions. Cross-flow paths, (6), indeed are found near the equator. Other cross-flow paths, (7), also occur in the south-polar region. In between, surface markings are interpreted as extensions, (8), of crossflow paths.

Above the surface of Dione on the left (north), a large opaque toroid, (9), claims filament (3) as its central axis. Unfortunately, this toroid partially obscures source detail. Appearances are that the source, (10), has an elliptical profile within which filaments issue from a turbulent surface. Small-diameter filaments from the source feed the toroid. Toroidal filaments, (11), in turn impinge upon the surface of Dione. Noticeably greater surface illumination in the northern quadrant compared with the southern quadrant may be attributable to this ring. Indications are that widespread surface modification is being experienced by Dione.

Presence of a nearby electromagnetic vehicle satisfactorily can explain Dione's observed situation. Specifically, an appropriately positioned vehicle has capability to encompass Dione with an electropotential (electromagnetic) field. Numerous body lateral projections and branches are available to sustain this encompassing field as Plate 30 so aptly shows. Matter spewed by these components is available for deposit. Indeed, Dione has given up a big secret. That mobile bodies of high electrical potential can entrap and disfigure celestial bodies has implications of unforeseeable magnitude.

CHAPTER 9

Iapetus Mystery Unraveled

Thirteen A-ring diameters distant from the center of Saturn pinpoints the orbital radius of Iapetus. Discovered by Cassini in 1671 Iapetus has been enigmatic from the very beginning of its recorded history. During the two years following discovery, Cassini found Iapetus to be invisible for months at a time. His observations indicated that the satellite would appear only in some parts of its orbit, and not at all in others. He concluded that, during the moon's passage around Saturn, various exposed faces exhibited considerably different reflectivities. Cassini held to his position for about 30 years when, to his dismay, he found Iapetus visible within a "forbidden" region.

About a century later, Sir William Herschel took the view that the discoverer's original position was the only one possible. However, Cassini's skepticism is meritorious in light of more recent data. American Professor Edward E. Barnard, in 1889, reported sudden disappearances of Iapetus while engaging in ring translucency observations. Further, in 1913, Harvard advocated more study of Iapetus because some observations had revealed sudden and large, irregular brightness fluctuations. Attempts to explain Iapetus must contend with these horns of an historical dilemma.

Plate 37 shows Iapetus exhibiting dichotomous facial topography adjacent to an active zone populated with circular and elongated light sources. Topography of Iapetus poses a scientific puzzlement in that two abruptly different surface compositions exist side by side. Water ice is thought to compose the light region, (1). The dark region, (2), is postulated to be a reddish-brown carbonaceous material akin to asphalt. Ice and asphaltic material indeed do have widely different surface reflectivities.

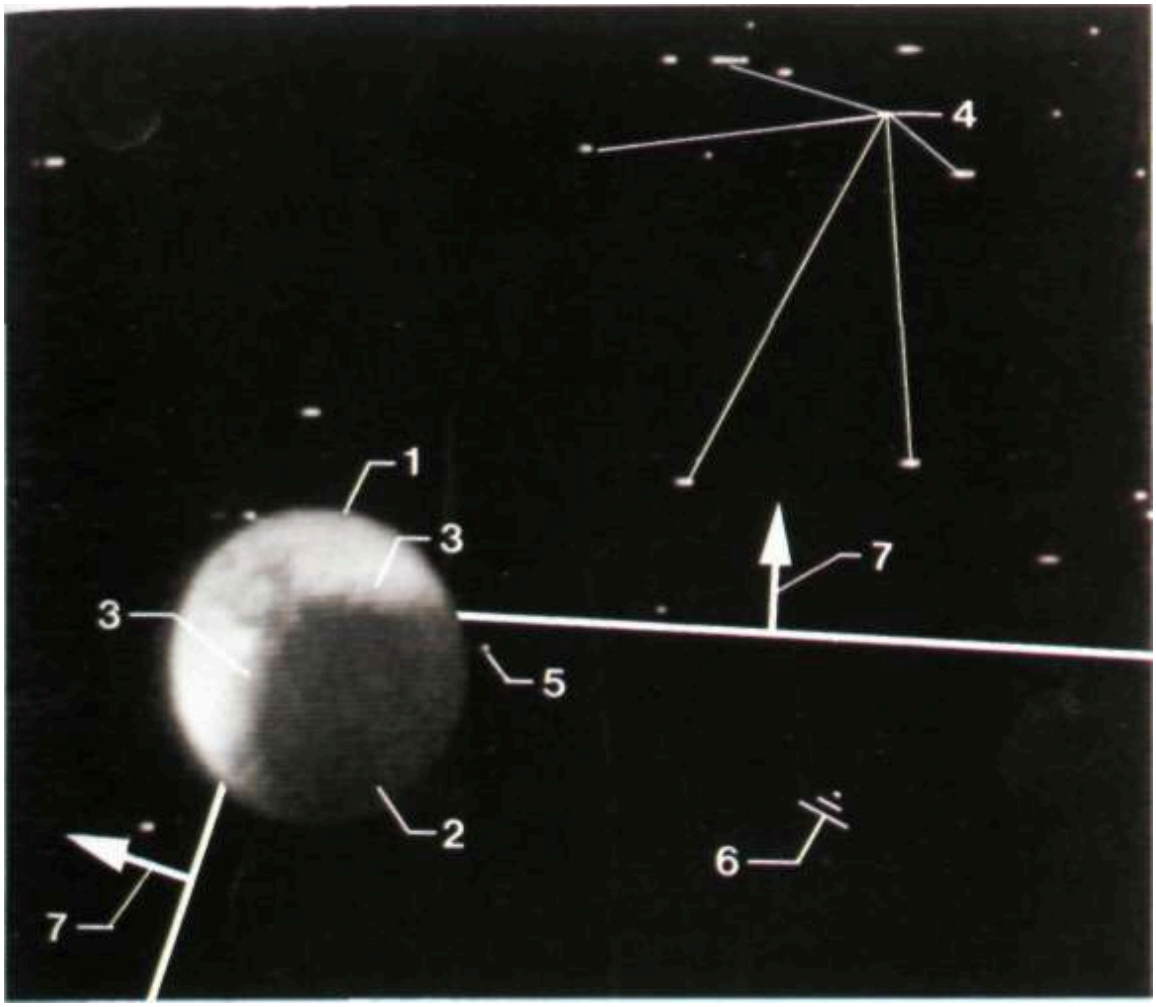


Plate 37*: Iapetus exhibiting dichotomous facial topography adjacent an active zone populated with circular and elongated light sources.*
1. Iceous region; 2. Asphaltic region; 3. Transition region; 4. Light sources; 5. Isolated light source; 6. Quiescent zone; 7. Active zone

With constant reflectivities, Iapetus could appear consistently visible in certain orbital sectors and invisible in others, as Cassini first surmised. However, Harvard's data indicate that surface reflectivity definitely does not remain constant. To the contrary, reflectivity is unpredictably quite variable. Identification of a suitable mechanism to explain any variability is a confounding problem. Volcanic action is rendered quite improbable inasmuch as a gradual admixture transition, (3), exists between the light and dark regions.

Characteristically, volcanic flows have sharply cut-off edges. On the other hand, identification of an external mechanism for depositing dichotomous substances is equally perplexing. Topography created by meteor impacts is not an adequate model because there are no radial rays emanating from circular areas which might be interpreted as craters. Clearly, some new mechanism is called for.

In addition to the dichotomous surface of Iapetus in Plate 37, there are also intriguing nearby light sources, (4). Circular and elongated, these sources are numerous; and their zonal distribution is biased. Except for a single source, (5), none lies within a quiescent zone, (6), formed by extending boundaries of the obtuse dark region, (2). Light sources being nearly exclusively confined to one active zone, (7), indicate a possible correlation with the iceous and asphaltic regions.

This situation might be likened to Dione in that electromagnetic light Plate 36. As with Dione, enhancement of peripheral space around Iapetus is necessary in order to disclose what comprises the environs. Again, superimposed images are employed to capture available spatial detail while preserving topographical clarity. Results are exhibited in Plate 38. This composite* photograph records Iapetus illuminated by, and peripherally linked to, an electromagnetic vehicle. Its cylindrical body, (1), is positioned horizontally across the top of the picture.

**For reasons already noted with respect to Dione in Plate 36, a white edging appears circumferentially around Iapetus.*

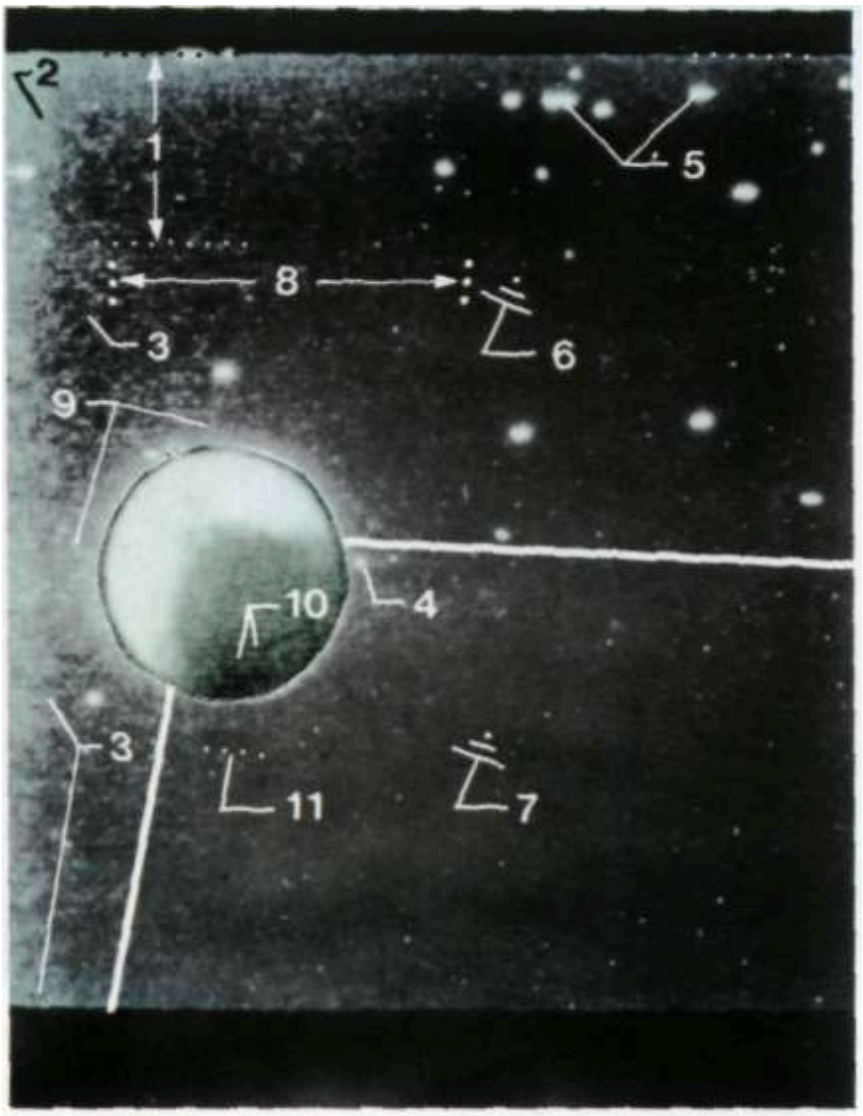


Plate 38*: Composite photograph of Iapetus showing illumination by, and a peripheral linking to, an electromagnetic vehicle.*
1. Cylindrical body; 2. Nose end; 3. Tongue; 4. Isolated light source; 5. Large light sources; 6. Active zone; 7. Quiescent zone; 8. Underbody emissions; 9. Radial links; 10. Roll filaments; 11. Roll filament source

Body diameter is estimated at 1000 km (620 mi). Illumination in the upper left corner reveals the nose end, (2). Protruding below the nose is a long tongue, (3), which extends past Iapetus along the left picture border. Except for isolated source (4), all the large light sources, (5), are included within the heretofore defined active zone, (6). The quiescent zone, (7), shows signs of activity, but of a different nature.

In Plate 38 profuse underbody emissions, (8), extend aft of the tongue a distance of at least 2 body diameters. Underbody emissions and the nose tongue are positioned essentially at right angles to one another. In effect, these two active components frame Iapetus into a corner. This corner-framing effect creates topographically an approximate three-quarter hemispherical sector of exceptional brightness. Shielded from tongue and underbody-emission radiation, the remaining sector is darker and appropriately shaped to reflect the corner framing. At the periphery of the white three-quarter region on Iapetus, tongue and underbody emissions form radial links, (9). At the periphery of the dark sector, the surface pattern extends into space. Inspection of the sectoral periphery reveals roll filaments, (10), which connect with an adjacent slender-body filament source, (11). Radial links and contrasting sectoral topography are a manifestation of vehicle activity. With an electromagnetic vehicle operating on Iapetus, Cassini's and Harvard's exceptional observations are quite understandable.

Iapetus has a diameter of about 1460 km (900 mi). Envelopment of such a large body by electromagnetic-vehicle emissions and appendages has ramifications of extreme importance. To augment illustrative detail, a montage* of localized micro-photographs has been assembled covering the entire photograph of Plate 37. This photographic endeavor is exhibited in Plate 39. The montage shows Iapetus subjected to an electro-potential field created by an electro-magnetic vehicle. Six items appearing in Plate 38 are re-identified for orientation purposes: (1) cylindrical body; (2) nose end; (3) tongue; (4) underbody emissions; (5) roll filaments; and (6) roll-filament source. Additional items identified subsequently serve to identify formation of an electro-potential (current-voltage) field.

**Use of a montage enables exposure time to be adjusted locally for the negative density of the ...*

[faulty scan]

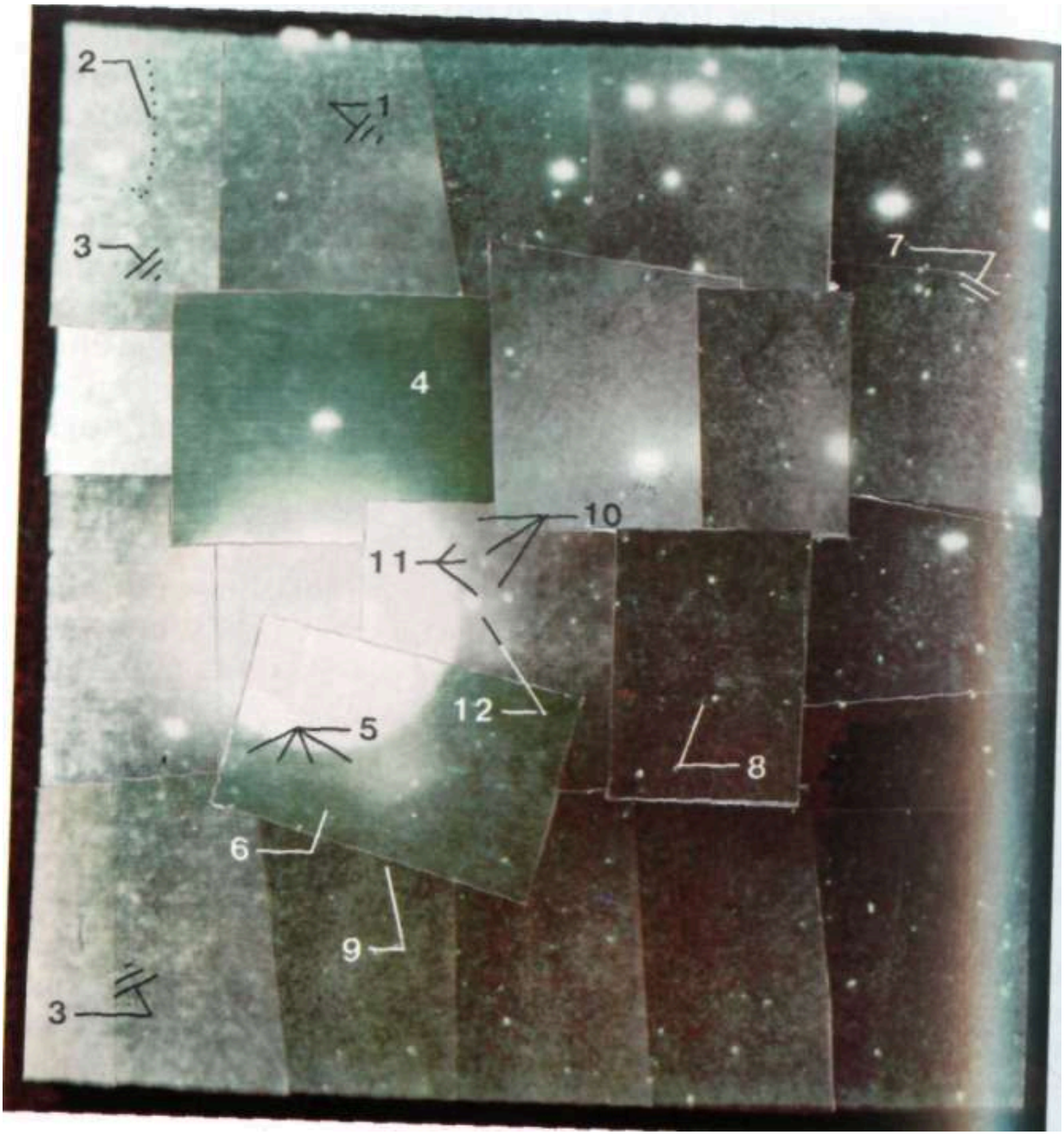


***Plate 39**: Micro-photographic montage showing Iapetus subjected to an electro-potential field created by an electromagnetic vehicle.*
1. Cylindrical body; 2. Nose end; 3. Tongue; 4. Underbody emissions; 5. Roll filaments; 6. Roll-filament source; 7. Body projection; 8. Branch projection; 9. Sub-branch projection; 10. Streamlines; 11. Current lines; 12. Singular point

Commencing at the side of the cylindrical body a projection, (7) is evident along the right side of the picture. Sprouting from this body projection is a long branch, (8), which connects with the tongue near the lower left corner of the montage. A sub-branch, (9), turns out to be the roll-filament source, (6), previously identified. Though of smaller breadth, another manifestation of branches from the body projection are streamlines labeled (10).

A streamline possesses the same electrical potential along its entire length; and various streamlines have different levels of potential. Current flowing from one potential level to another
takes the shortest route. The result is that current lines, (11), arrange themselves perpendicularly to equal potential lines. One streamline terminates at the surface of Iapetus. At this termination point, a localized flow stoppage occurs and energy is released. Singular point, (12), is such a point wherein flow around Iapetus experiences adjustment electrically as well as physically. Heretofore, this singularity point has been identified in Plates 37 and 38 as an isolated light source. Uniqueness of this particular source is attributable to its special relation to the electro-potential field around Iapetus. Other light sources are vehicle related and identify localized regions at which voltage adjustments are occurring.

A model approximating an electro-potential field around Iapetus can be calculated from equations governing ideal fluid flow past a sphere. These equations are also the same ones which describe an analogous electrical flow field around a sphere. Plate 40 pictorializes an ideal electro-potential flow field for a conducting sphere located between bi-level voltage sources. Part (a) depicts the current paths and part (b), the streamlines or equi-potential* lines as they are sometimes called.

**Equi-potential is a short form of the words "equal potential" and means that a single streamline is at the same potential along its entire length.*

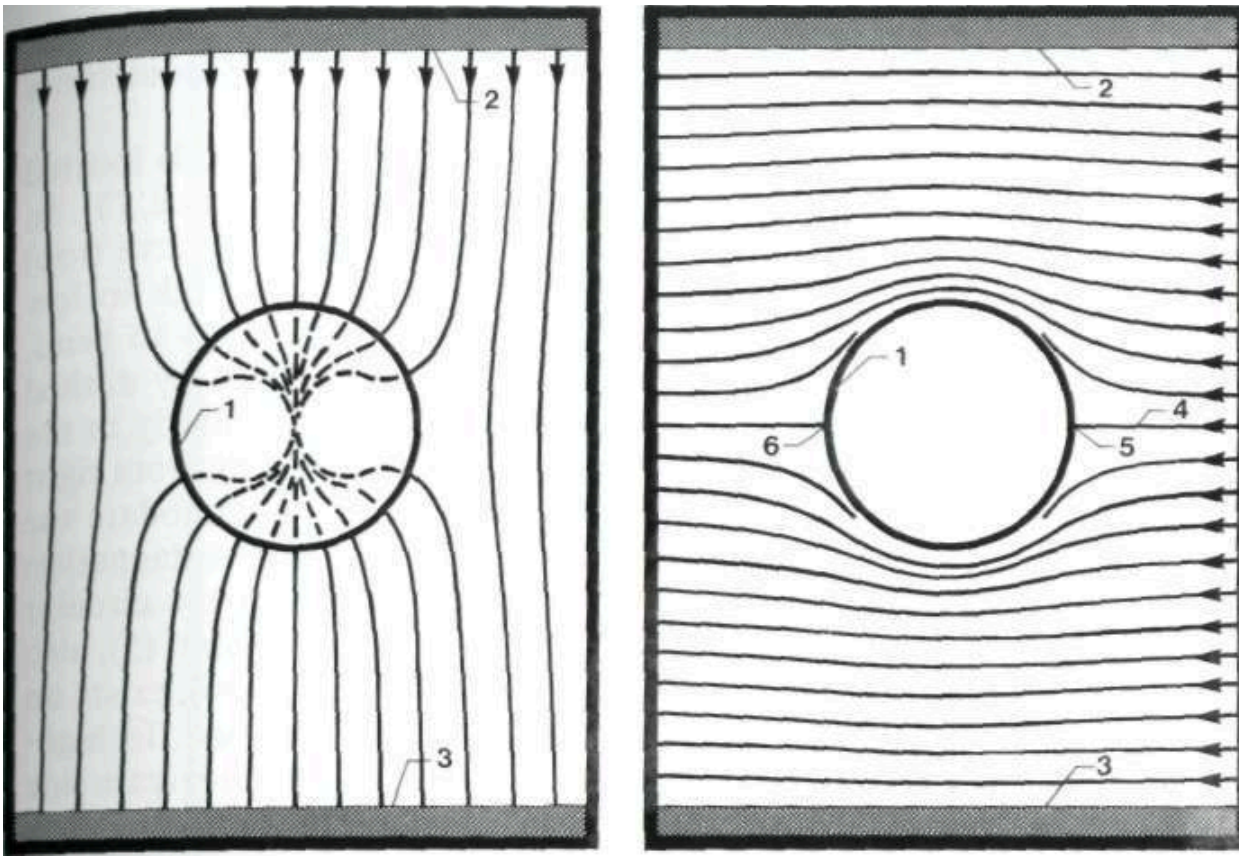


Plate 40*: Electro-potential flow field for a conducting sphere located between bi-level voltage sources.*
1. Sphere profile; 2. High-voltage source; 3. Low-voltage source; 4. Stagnation streamline; 5. Up-stream singularity; 6. Down-stream singularity

In Plate 40, a cross-section of a conducting sphere, (1), is located between a high-voltage source, (2), and a low-voltage source, (3). In part (a), electrical current travels from the high-voltage source (top) to the low-voltage source (bottom). In traveling from high to low potential, the obstructing sphere induces the current paths to bend Some current paths pass through the sphere as indicated by dashed lines. Those paths which enter and exit do so perpendicularly to the circular profile. In part (b), streamlines are shown moving from right to left.

Curvature of the streamlines is such as to accommodate the circular profile and the straight-line sources (2) and (3). The stagnation streamline, (4), on the axis of symmetry terminates at the circular profile. This terminal locates the up-stream singularity point, (5), also known as a stagnation point. Another singularity point, (6), exists on the down-stream side for the ideal-

flow condition assumed. In highvelocity real flow, though, turbulence prevails on the down-stream side preventing formation of coherent streamlines and a second stagnation point.

Electrical-current paths and equi-potential paths exist concurrently and occur orthogonally. That is, the two types of paths simultaneously occur mutually perpendicular to one another. Plate 41 illustrates a network of current and equi-potential paths calculated for ideal flow in front of a sphere.

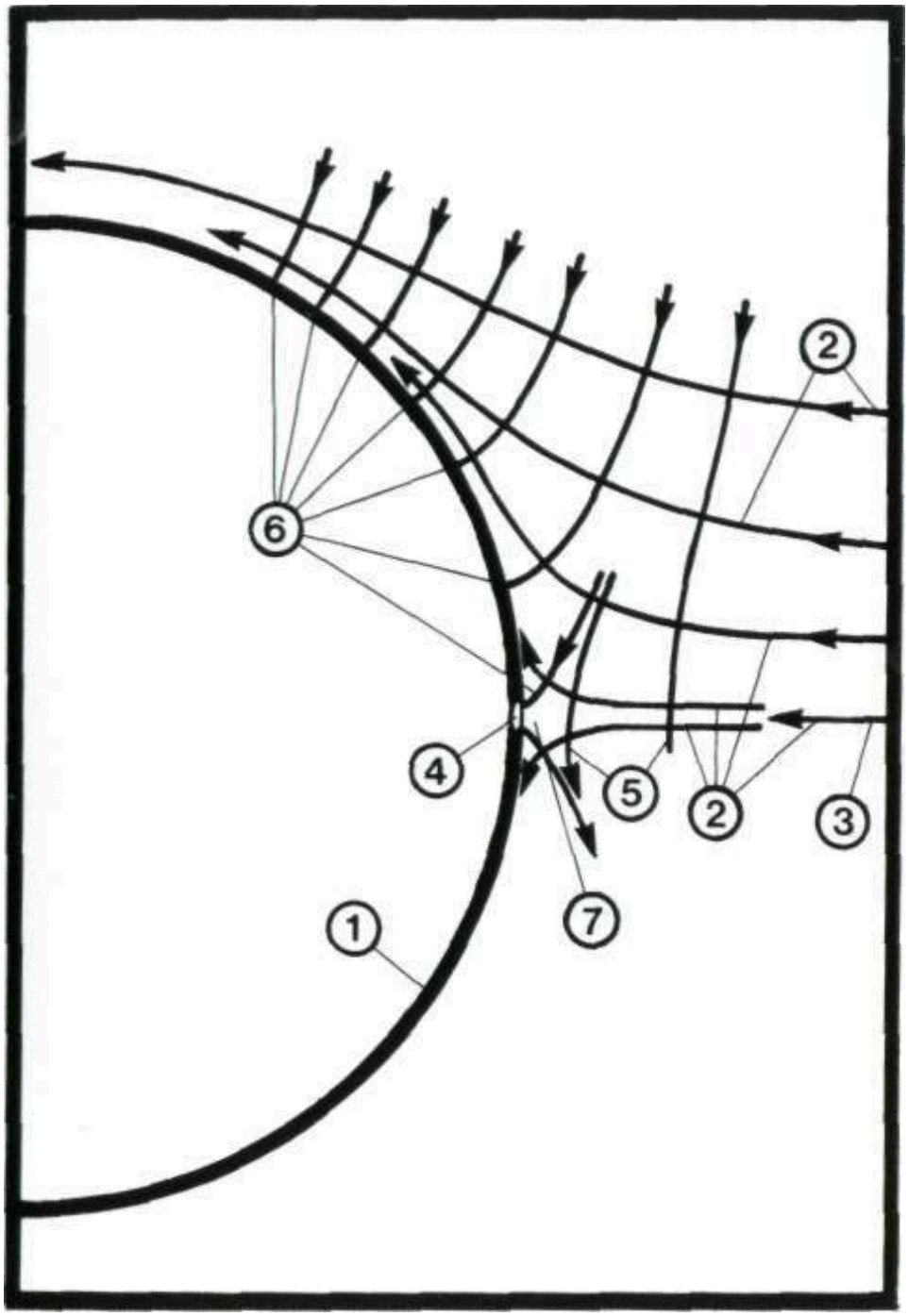


Plate 41*: Network of electrical current and equi-potential paths calculated for a sphere in ideal flow.*
1. Sphere profile; 2. Equi-potential paths; 3. Axis of symmetry; 4. Stagnation point; 5. Non-entering current paths; 6. Entering current paths; 7. Stagnation region

Flow proceeds toward the sphere, (1), from the right as indicated by the direction of the equi-potential paths, (2). All potential paths pass by the sphere. The streamline on the axis of symmetry, (3), becomes the sphere boundary commencing at the stagnation or singularity point, (4). In contrast, only those current paths, (5) forward of the stagnation point pass by the sphere. All other current paths, (6), immediately downstream of the stagnation point enter the sphere radially. Intersections of current and equi-potential paths form a network of distorted squares and rectangles. A small, unique stagnation region, (7), is formed forward of the stagnation point. This region is bounded by the sphere, two streamlines astride the axis of symmetry, and two current paths. One current path is aft of the stagnation point and enters the sphere. The other is forward of this singularity point and does not enter the sphere. Within the region there is a concentration of energy corresponding in location to the isolated light source labeled (4) in Plate 38. Further, the network of distorted rectangles and squares resembles analogously located actual ones displayed by Iapetus in Plates 38 and 39.

Additional information can be deduced about Iapetus. Plate 42 illustrates Iapetus constrained by the forward electro-potential field of an electromagnetic vehicle as rendered from Plates 38 and 39. Constraint physically is quite real in that substantial forces are present in the field. For example, streamline flow, (1) from the right forces Iapetus toward the left (white arrow); but tongue, (2), prevents lateral movement (black arrow). In the vertical direction, Iapetus is pushed away from the vehicle body, (3), by underbody emissions, (4), (black arrow). This push is balanced by an opposing force generated by the asymmetrical flow (white arrow). Balanced forces maintain Iapetus at a steady position relative to the vehicle. However, were forces unbalanced, the satellite would drift into a different orbit. Though orbital-path changes have not been cited over long-term observations of Iapetus, a vehicle mechanism for moving the satellite nevertheless does exist.

***Plate 42**: Illustration of Iapetus constrained by the electro-potential field of an electro-magnetic vehicle as rendered from Plates 38 and 39.*
1. Streamline flow; 2. Tongue; 3. Vehicle body; 4. Underbody emissions

Exposure of Iapetus to the electro-potential field illustrated by Plate 42 will leave divers surface scars when the field disappears. The tongue, for example, will leave a long, broad depression with spidery edges. Turbulent flow and electrolytic* action over the surface will produce deposits, the composition of which derives from emitted vehicle products. Most pre-existing topographical prominences within the flow will undergo severe erosion. Depending upon circumstances, prominences might assume streamlined shapes from coherent flow or

peculiar forms due to turbulence. Electrical-current entry and exit areas will be marked by craters whose interiors are pitted from stray subordinate fingers of current. Dominantly, however, prolonged application of heat from the tongue and underbody emissions will, in time, melt the surface. Evidence of current-formed craters and other formations will be erased and, in turn, the surface will be left smooth.

**Chemical decomposition by the action of electric current.*

Observers of Iapetus have wondered how the iceous region, being shadowed from the sun, can be so intensely bright. They have wondered how the iceous surface can change so abruptly into a radically different asphaltic composition. They have wondered about unexpected flashes of light, large variations in surface reflectivity and sudden disappearances from view. The mystery is resolved completely and satisfactorily by the nearby presence of an active electromagnetic vehicle.

PART IV

GLIMPSE OF A BIGGER PICTURE

CHAPTER 10

The Lunar Connection

Dione and Iapetus both have been subjected to the burning fury of visitation from an electromagnetic vehicle. Each has experienced topographical structuring caused by various emissions which these high-potential units possess. In the case of Iapetus, structuring can be deduced to be much more than a surface phenomenon. In being subjected to the observed electro-potential field, electrical currents enter Iapetus, converge within the interior, then exit. Surfacedistributed entry currents combine to reach a large magnitude near the center. Consequently, a situation is established wherein considerable heating of the core occurs, perhaps to the extent of producing a molten constituency. Simultaneously, a situation also is created whereby extraneous material is shedded at the surface as current shafts enter the satellite. This latter situation is supported by photographic observations of dark material on the periphery of Iapetus where current paths have been found to enter.

Besides deposits, visitations are evidenced by a wide assortment of surface scars. Most familiar are craters of widely ranging diameters. Other scars are in the form of rills, ridges and thermo-set areas having surfaces of indistinct features. Dione exhibits mostly distinct craters, rills and ridges whereas Iapetus displays a dimpled surface with indistinct features. Differences can be attributed to the particular vehicle component creating the scar and the amount of attendant heating. For a given electromagnetic vehicle, the maximum diameter for a round scar (e.g., a crater) would be a size approximating vehicle body diameter. Because these spacecraft have long-range cruise capability, any solar-system body becomes a suspect candidate for having experienced visitations.

A generalized scientific concept must fit circumstances other than the particulars from which it derives. Additional situations involving Saturn and environs act mainly to augment particulars. Moreover, available topographical imagery is rather sketchy and too wanting in overall detail for demonstrating application using other Saturnian satellites. Earth's moon, on

the other hand, enjoys the most complete and highly detailed mapping of all the celestial bodies. Furthermore, remote independency exists with respect to the Saturnian complex Consequently, earth's moon makes an ideal candidate with which to test the concept of vehicle-created surface scars.

Of all the lunar scars, those of Mare Orientale or Eastern Sea rank among the most spectacular and noteworthy. This lunar feature is not familiar to most earth inhabitants because of its unfavorable location for viewing. Specifically, Mare Orientale sits astride the western limit of moon visibility from earth, with only eastern ridges of its huge basin barely exposed to sight. Compound surface scars can be comprehended best by viewing them in global perspective. As an aid, Plate 43 presents Mare Orientale as portrayed on an official moon globe.*

**Manufactured by the Geographical Globe Division of Meredith Corporation, Chicago, Illinois, this globe simulates lunar topography as depicted by photography from various NASA circumlunar missions.*

Plate 43*: Mare Orientale as portrayed on an official NASA moon globe. 1. Visibility limit; 2. Outer ridge; 3. Inner ridge; 4. Center pit; 5. Glazed surface; 6. Radial markings*

The central region consists of two concentric, near-circular ridges stretching bi-laterally across the western visibility limit, (1). The outer ridge, (2), has a diameter of about 965 km (600 mi); and the inner ridge, (3), has a diameter of about 550 km (340 mi). These ridges surround a center pit, (4), whose breadth is of the order of 240 km (150 mi).

Photographic mosaics of the area reveal that this pit is a deep hole, and not a smooth continuum of a broad basin. The floor of the hole is reported to contain patches of dark basaltic material. Additionally, the mosaics show a glazed surface, (5), around the eastern periphery. Radially disposed markings of rills and ridges, (6), occur on the northern and southern sides. In the north and south, these radial markings are found within an included angle of about 100 degrees. In the east and west though, radial markings definitely are absent within the remaining angular area. Instead, different markings prevail. Incomplete radial symmetry negates meteor impact in that a hit should produce full-circle radial splash marks.

Surface scars and markings on celestial bodies long have been used as indicators of earlier events. Typically, craters have been cited as evidence that meteors, or showers of meteors, have impacted in prehistoric times. Thus, scars and markings are, in themselves, informational data; and interpretation of their geometry and contents has become acceptable practice. Now, let us examine Mare Orientale without preconceived notions regarding its formation, and permit the configuration to speak for itself.

Plate 44*: Configuration interpretation of lunar markings at Mare Orientale utilizing an official NASA moon globe.*
1. Central hole; 2. Inner ridge; 3. Outer ridge; 4. Southern radials; 5. Serpentine strip; 6. Oblate ellipse; 7. Pinched flow; 8. Eastern ear; 9. Western ear; 10. Secondary marking

Plate 44 presents a configuration interpretation of lunar markings at Mare Orientale utilizing an official NASA moon globe. In the plate, region (1) delineates the central hole, and circles (2) and (3) the inner and outer ridges,

respectively. Rook Mountains is the name which has been given to the inner ridge and Cordillera Mountains, to the outer ridge. Line (4) circumscribes the southernmost exhibit of radial markings. This exhibit is separated by a serpentine strip, (5) which terminates at the south pole about 1600 km (1000 mi) distant.

Another interpretation in pattern occurs at the southern extremity of the Cordillera Mountains. There, a short section of mountain range deviates significantly from a circular contour. Accordingly, the outer ridge circle can be described as having a "trough" in it due to this deviation. An "inverted trough" is formed above by small rills and ridges between the inner and outer ridges. The resulting enclosure, which approximates an oblate ellipse, (6), encompasses surface which is relatively smooth compared with surface outside the oblate enclosure.

Due north of the outer ridge, a bulbar band of terrain, (7), is outlined longitudinally by two undulating lines. Terrain between these two lines exhibits surface features which change rather abruptly across the boundaries. For example, there are radial markings terminating just inside the boundary line on the right; on the left, there is a smooth rippled surface changing to a pitted one; and in the middle, there are numerous closely-packed and overlapped craters. This localized admixture of non-homogeneous surfaces suggests that simultaneous events of common origin are needed to produce the topography shown.

A physical mechanism which could create the bulbar-shaped region portrayed in Plate 44 is an overlying impinging high-temperature pinched-plasma flow. Centrally within band boundaries, closelypacked and overlapped craters would be formed by electrical-current arcs which jump repeatedly from the pinched-plasma flow to ground (i.e., to the surface). That the central region should be most cratered is consistent with this area being the shortest electrical route between the impinging flow and the surface. Adjacent to the eastern and western sides of the outer ridge, the terrain displays a knurled character and includes some small rills and ridges. Propitious location of this latter terrain with relation to the Mare basin "facial" outline suggests the terminology "eastern ear", (8), and "western ear" (9). Unenclosed markings, (10), consisting of rills, ridges, rivulets and small craters in tandem, radiate outward and upward from these ears. All

patterns heretofore described reasonably are interpretable as being family-related with respect to the Mare central hole and basin.

Collectively viewed in perspective, composite diagnostic markings of the Mare Orientale moonscape pictorially describe an elementary frontal image of an electromagnetic vehicle. Reality of the extraordinarily broad Mare Orientale vehicle-caused imprint can be comprehended with visual assistance from a combination model of moon and vehicle.

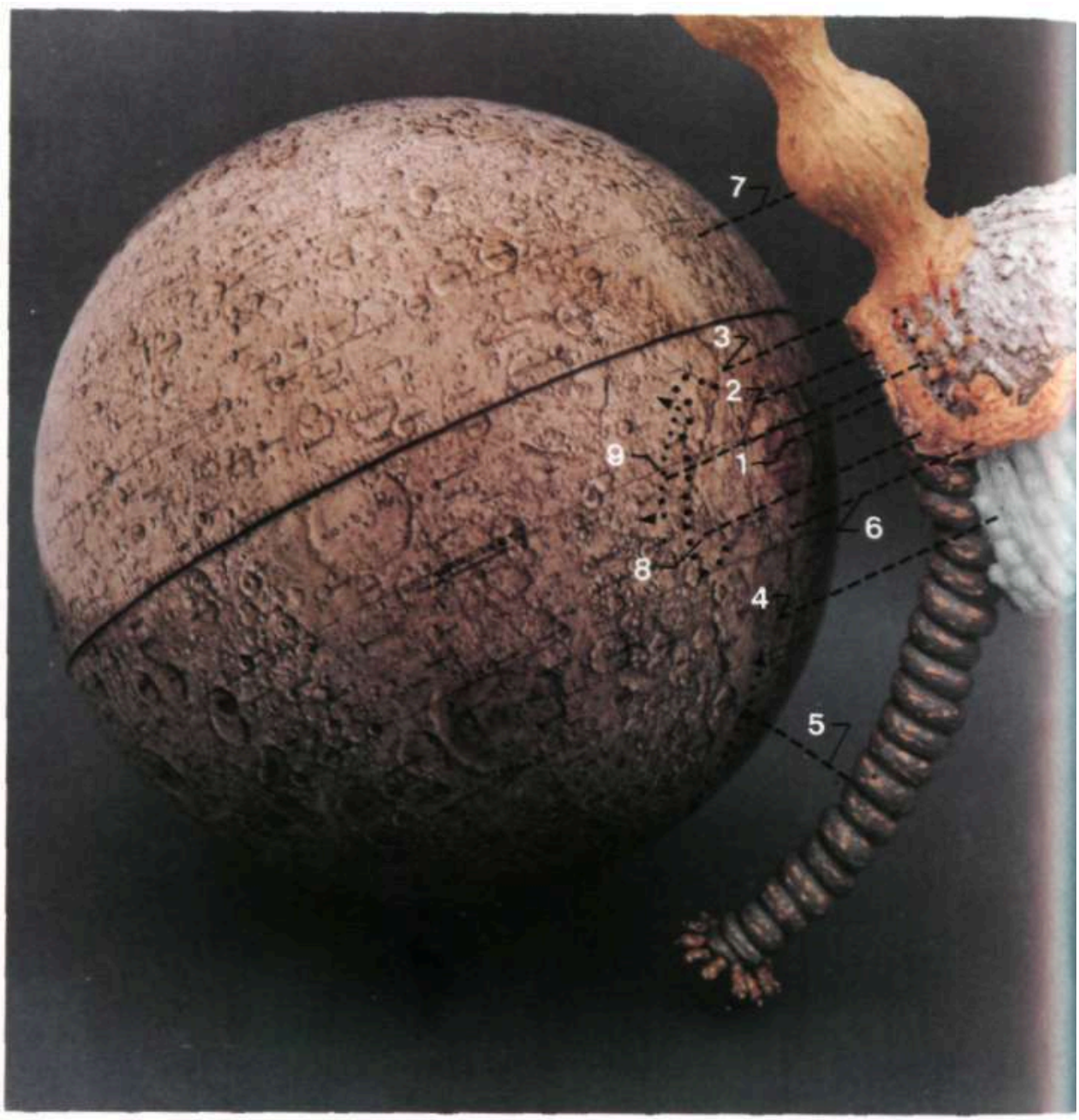


***Plate 45**: An electromagnetic vehicle and a NASA moon globe co-scaled and positioned to illustrate formation of Mare Orientale.*
1. Central hole; 2. Inner ridge; 3. Outer ridge; 4. Southern radials; 5. Serpentine strip; 6. Oblate ellipse; 7. Bulbar region; 8. Western ear; 9. Secondary markings

Plate 45 shows a model electromagnetic vehicle and a NASA official moon globe co-scaled and positioned to illustrate formation of Mare Orientale as developed pictorially in Plate 44. The nose end of the vehicle model appears at the right positioned to have center-to-center alignment with the Mare Orientale hole and basin. Body diameter, to the scale of the lunar globe, is 965 km (600 mi). This small-scale model is a highly simplified replica of the vehicle identified near Iapetus in Plate 38. Component-item details have been sculptured to simulate those suggested by imagery of Plates 30 and 38. Direct correspondence between specific lunar-surface areas and particular vehicle components becomes apparent when the two bodies are co-aligned as shown.

Table II correlates individual Mare Orientale surface-area elements, pictorialized and delineated in Plate 44, with their respective formative vehicle components.

TABLE II: Correlation of Specific Mare Orientale Lunar-Surface Areas with Formative Components of an Electromagnetic Vehicle as Depicted by 180 mi/inch Scale Models

Item No.	*Mare Orientale Area Element*	*Formative Vehicle Component*
1	Central hole	Axial-exhaust flame core
2	Inner ridge	Axial-exhaust outside diameter
3	Outer ridge	Body diameter
4	Southern radials	Underbody emissions
5	Serpentine strip	Tongue
6	Oblate ellipse	Nose peripheral plasma
7	Bulbar region	Pinched-plasma nose streamer
8	Western ear	Nose peripheral plasma
9	Secondary markings	Body side emissions

In addition to the preceding 9 major items of matching surface and body configuration, some minor items also fall into place. For example, random crater formations within any lunar surface-area element can arise from

spurious electrical currents which arc from vehicle to surface. Also, numerous tiny craters can be pierced by branches from constituent strands comprising larger currents. Patches of "foreign" material can be deposited in various topographical patterns by electro-chemical processes due to presence of an electropotential field. Further, intense heat from the axial-exhaust core can explain an apparent glazed surface which surrounds the central hole. Thus, wide-scope consistency prevails concerning formative characteristics of Mare Orientale. Broad consistency, such as found here, usually is a mark of correct analysis.

Ancient lunar presence of an electromagnetic vehicle at Mare Orientale can resolve other perplexities concerning the moon. One of these perplexities is that a significant magnetic field, according to evidence, must have existed on the moon about 3 to 4 billion years ago Interestingly, the age of Mare Orientale independently has been pegged at about 3 to 4 billion years. Discovery that the unorthodox sectorial illumination of Iapetus is attributable directly to the presence of an encompassing electro-potential field leads to a tentative conclusion about the long-extinct lunar magnetic field. Specifically, the conclusion is reached that the moon has, at some time, experienced the same treatment as Iapetus. According to Plates 44 and 45, an identifiable time at which the moon has undergone magnetizing influences is from an electromagnetic vehicle while forming Mare Orientale. Co-supportive ages of Mare Orientale and ancient lunar magnetism inferentially age-dates the mechanism responsible. Specifically, the conclusion can be drawn that electromagnetic vehicles themselves have been around for a long time - at least 3 to 4 billion years.

That electromagnetic vehicles are connected anciently to lunar formations distinctly opens a strong possibility of a past intimacy with earth. Implications to this effect already have been signaled by terrestrial rocks which date back to about the same birth date as Mare Orientale. A lunar connection with electromagnetic vehicles neither abrogates nor conflicts with data obtained from moon-orbiter missions and landing excursions. This integral posture is much more substantial than concepts which explain prehistoric data only for narrow circumstances.

CHAPTER 11

A Perspective

Existence of extraterrestrial space vehicles of enormous size and power is a fact, the significance of which is difficult to grasp, let alone assess. Departing now from the tedious fact-development process, this chapter stands back and takes a philosophical look at findings.

In the foreground is an immediate question, "Are there extraterrestrial beings?" A short answer is, "Probably". All photograph negatives examined by the author have revealed no direct evidence of beings. However, a strong implication that extraterrestrials do exist arises from electromagnetic vehicles being positionable. A source of intelligence is required to accomplish stability and control for positioning. This observation is a fall out from noting that the inner and outer diameters of Saturn's A, B, and C rings have remained substantially, but not identically, the same over a period of years. From a design viewpoint, electromagnetic vehicles represent ultrasuperlative achievements in nuclear physics, aeronautics, astronautics, magnetohydrodynamics and engineering. Inferentially, such attainments only could be achieved by a long-term, goal-oriented, non-selfdestructing society.

Electromagnetic vehicles possess obvious devastational capabilities which might evoke fear and anxiety in some people. These discomforting emotions can be alleviated upon realization that these powerful vehicles have been around for many, many centuries; and the human race still continues. In terms of a clear and present danger, man-made nuclear bombs pose more of an immediate large- scale threat to human life. In contrast, an apparent long-term commitment by electromagnetic vehicles to the continuance of the human life chain is comforting.

To anticipate, though, a perpetually unmarred status quo in the character of our earthly habitat is really an unreasonable expectation. To illustrate, a sudden change in the surface of the Earth occurred 30 June 1908. On this day, a violent thunderous explosion rocked an area near Tunguska in

Central Siberia, USSR. Twelve hundred square miles became devastated. Small villages and wildlife disappeared during this blast. A large forest was flattened. According to eye-witness accounts, a flaming cylindrical object was sighted in the vicinity just prior to the explosion. After years of intensive study and scientific research, a firm conclusion has been drawn that the devastation had been caused by an aerial nuclear explosion.

Supporting this conclusion is the Hiroshima nuclear-bomb destruction which produced a surface devastation pattern similar to that recorded at Tunguska. Some scientists go farther with an assertion that the devastation had been caused by an extraterrestrial spaceship which exploded. After all nuclear bombs had not been invented at the time of the 1908 explosion; and furthermore, they submit, there were eyewitnesses.

The Tunguska story affirms the existence of cylindrical vehicles and their nuclear character. This affirmation is quite important in that science now harbors bona fide repeat observations of these ultra-high energy units in the solar system. A concentrated presence of them appears at Saturn, thereby introducing the interesting speculation that the planet serves as an operational base.

Ultra-superlative intellect is implied by the existence of these highly sophisticated electromagnetic vehicles. Not only do these units demonstrate mastery of nuclear power and massive electro-potential force fields, but also they show an ability to modify extensive surface areas of large celestial bodies. Indeed, a realistic possibility is raised that goodsized celestial bodies can be moved about. These capabilities clearly place the human race at a comparative disadvantage. To cite a practical example, the Tunguska explosion demonstrates that an
electromagnetic vehicle, should it elect to strike a densely populated area, could inflict massive human termination. While wide-spread catastrophic destruction in the past may have occurred, such as that which wiped out the dinosaurs, presently a compassionate policy of forbearance seems to be in effect.

Forbearance of catastrophic destruction does not imply forbearance of lesser destruction. That is, narrowly spread destruction might be occurring

continually. Several possibilities present themselves. Quite conceivably, electromagnetic vehicles could be generators of tornadoes and hurricanes. In certain instances, inexplicable, sudden, intense fires also might be attributable to these space-craft. A likely simple example is transformer fires at the top of power poles. A much more subtle possibility might be electromagnetic alteration of human body tissues inasmuch as electrical fields attendant with vehicles can extend over thousands of miles. Of these possibilities, weather is the easiest with which to relate.

With the advent of television, various components of weather have become common knowledge. For example, continental high- and low-temperature distributions, hot- and cold-air masses or fronts, barometric pressure variations, and dynamic cloud formations have become terminology familiar to most newscast viewers. Wind, rain, snow, humidity, lightning and thunder showers are explained using the aforesaid terminology. Weather terminology permits dialogue concerning what is transpiring, but it does not get to the root of weather inception. Were weather inception understood, weather would be predictable. As is well known, weather is not predictable. Despite all the technical dissertations and theories over the years, inception of Earth weather remains a mystery.

At least part of Earth's weather no longer is a mystery. A new weather component termed "dry lightning" has crept quietly into weather descriptions. Prior to invention of this term, lightning had been associated only with the presence of cloud formations. This situation has changed. Lightning is being reported in clear blue sky absolutely devoid of clouds. Thus, lightning in waterless sky is called dry lightning. Categorically, illuminated electrical currents around Iapetus qualify as dry lightning in that these currents occur in absence of water clouds. Saturnian lightning shown in Plate 16 also qualifies. Interestingly, electrical currents of Iapetus and Saturnian lightning bolts are generated by electromagnetic vehicles. These findings support a proposition that dry lightning in Earth's atmosphere is a proximity indicator of one or more of these powerful bodies.

Electromagnetic vehicles might be viewed as superimposing their weather-making influences upon Earth's inherent weather components or alternatively, as weather instigators. Both concepts are regarded as posing

no conflict with weather-model efforts. Rather, knowledge of vehicle presence can aid modeling efforts. For example, a reason becomes available for adding or subtracting energy in order to secure a global heat balance. Measured shrinking of the Antarctic ice cap is a case in point. Heretofore, a heat source has not been available to account for known melting. Long-term addition of heat by vehicular sources opens new avenues for modeling weather and global heat balance.

On each extremity of Saturn's rings, cylindrical bodies have been photographed spewing emissions. These emissions assume complicated patterns while contributing compositional material for the rings. A time-varying appearance of Saturn's disc is a natural consequence of this process. The B ring and inner- and outer-A rings are separate entities because different vehicles fabricate these rings, intervening spaces, such as the Cassini and Enke divisions, are safety buffer regions to preclude vehicle collisions. Therefore, nothing needs to "scoop out" these divisions in order to create open space. Indeed the Cassini and Enke gaps may contain something or nothing at all depending on whether emissions are permitted to intrude.

A number of vehicles have been identified within Saturn's ring disc In a sense, Saturn's disc can be considered a huge, polluted parking lot or rendezvous, for extraterrestrial spacecraft. Density and thickness of this pollution can vary considerably according to the number of craft present, their positioning and modes of operation. Presence of electromagnetic vehicles near other planets is intimated by a finding of rings, the signature left by exhaust and emission products persisting in orbit. These sophisticated pollutants trigger a realization that manmade products and processes may not be the sole cause of Earth's dirty atmosphere. For example, electromagnetic vehicles might provide a partial answer regarding why acid rain sometimes occurs in regions having no terrestrial acid-rain-making capabilities. Quite possibly, a challenging new era may lie ahead concerning governmental management efforts to maintain environmentally clean air.

During the flyby of Saturn and its moons, Voyager 1 observed 15 satellites. Except for one, Titan, these satellites have been identified as being covered

with water ice, either wholly or partially. Water ice even is postulated to be a major constituent of Saturn's rings. Such extraordinary prevalence of common ice is quite significant. Icy Iapetus is a case in point, as positive identification has been made of a cylindrical vehicle positioned nearby. This situation justifies an assertion that the icy surface may be a result of water having been generated by an electromagnetic vehicle and shaped later in a frozen state by directed heat applications. Ice-skate-rink smoothness could be attained by heat application from suitable body components such as axial exhaust flame. Icy constituency of Saturn's satellites possibly indicates that Earth obtained its polar ice caps by extraterrestrial means.

Some scientists claim that Earth is progressing into another ice age. Others note definite increases in global mean sea level and receding glaciers and claim a significant warming trend which has caused massive discharge of melted polar ice. In observing these global changes, a reduction in Earth's rotational velocity also has been detected. Only three-fourths of this reduction in angular velocity can be accounted for. It is conceivable that the other one-fourth might be accounted for by a cylindrical vehicle flying within Earth's magnetic field. Such flight would give rise to electromagnetic drag operating on the craft. Then, in accordance with the Newtonian principle that for every action there is an equal and opposite reaction, a drag on Earth's rotation is imputed. Once again, a new variable exists which possibly might fill a gap in scientific thought.

Electromagnetic vehicles represent extreme, ultra-high technology. Earth has nothing remotely comparable with which to compete. So far, development of a competing technology is not an obviously compelling need. What is compelling, however, is the need for a much deeper and broader understanding. To illustrate, on 22 September 1979 a U.S. satellite recorded a bright flash aloft between South Africa and Antarctica. After prolonged analysis of the data, federal laboratories concluded that the satellite saw a nuclear blast. During the study, the high-level White House blue-ribbon analysis committee ultimately became divided into believers and non-believers. Believers think that data from the event match known signatures of nuclear blasts. Nonbelievers think that some natural event induced the satellite to make an erroneous report. Both groups can be correct when the blast is attributed to action by an electromagnetic vehicle.

A potentially grave hazard is posed. Specifically, an international nuclear exchange inadvertently could be triggered by nuclear events originated by an extraterrestrial third party. Electromagnetic vehicles will hold the balance of power for centuries to come. Lest extraterrestrial interlopers unsuspectingly induce nuclear warfare, a unified world should be a matter for serious consideration. Moreover, catastrophic extinction of the human race is a realistic threat which needs to be addressed.

Researchers have established that Earth has experienced catastrophic large-scale life extinctions about every 26 million years. One of these extinctions, that of dinosaurs, is theorized to have been caused by impact of a huge meteor striking Earth. Other possibilities are a comet or an electromagnetic vehicle. Had Comet 1979 XI, detected by U.S. Navy satellite F-78-1, hit Earth instead of the sun on 30 August 1979, a catastrophic extinction no doubt would have occurred. Close inspection of the before-collision photographs suggests a long body having emissions closely resembling those pictured in Plates 7 and 8!

Comets actually may be directed electromagnetic vehicles traveling at high speed. This assertion is supported by a satellite picture of Comet IRAS-Araki-Alcock (1983). One equilibration is that the nucleus of this comet can be construed to have a fineness ratio of about 12 to 13. Another equilibration is that the nucleus possesses features similar to the body shown in Plate 6. To wit, part of the slender-body nucleus is intensely white, and the remainder a darker color. Moreover, other comets, specifically Kohoutek (1973-74) and Bennett (1970) can be interpreted as an electromagnetic vehicle projecting a fire-ball ahead of the body. As has been shown, electromagnetic vehicles have fire-ball generating capability. These bodies most certainly are suitable mechanisms for causing catastrophic extinctions, with an attendant possibility that their missions are controlled. Collisions may not be a necessary condition for catastrophe; a near-miss might well be sufficient.

Planetary rings are an indicator of past, or current, presence of electromagnetic vehicles. Jupiter and Uranus both are known to have rings. The sun has been discovered to have a ring of globular matter surrounding

it. Our own asteroid belt is a ring. Even a ring around the solar system is believed to exist. Discovery of others practically is a certainty. For example, no surprise should occur if planetary nebula NGC 6781 were found to emanate from, and be a property of, a superbly large electromagnetic vehicle. This concept poses no conflict with the notion that the nebula ring results from radial expansion of matter from a central source.

Jupiter, Uranus and NGC 6781 are far away. Therefore, one might submit that events at such remote places have no importance to human beings. Maybe. Though also far away, activity at the sun more readily is acceptable as a concern. An example might be that some solar flares are highly correlatable with anomolous terrestrial weather. Generally, any major interference with solar functioning, such as by object 1979 XI, operates temporarily to alter Earth weather. These occasions are marked on the sun by abnormal electrical-field patterns which interact with those of Earth. Anomolous sun activity, by triggering weather changes, in turn can occasion severe down-stream socio-economic impacts. Electromagnetic vehicles also may operate quite remotely from the sun, yet directly exert significant physical effects on Earth. Severe thunderstorms, tornadoes, flooding, droughts and certain types of fires all might be symptomatic. Even less obvious might be subtle effects exerted on the human body by innocent exposure to focused electro-potential fields.

Photographic data recorded impersonally by satellite stand on their own without having to doubt a human photographer. No need exists for a protective requirement that several independent cameras witness the same thing as a condition precedent to credibility. For a sighting of an unidentified flying object, an analyst may require three or more observers of the same object as a condition precedent to credibility. Information output, though small and tending toward high quality, still is inadequate compared with hard data provided by remotely procured photographs. Unidentified flying objects (UFO's) being on a soft data base incomparable with a hard base for the electromagnetic vehicles (E.M.V.'s) reported herein, they necessarily must be, and are, excluded from discussion.

As a practical matter, technical discussion of UFO's virtually is never possible even with absolutely valid information. The fact is that there are,

and there always will be, UFO's. The reason simply is that substantially all witnesses are equipped inadequately to describe or interpret what they see in terms of a physical discipline. Consequences of this limitation can be illustrated by an hypothetical early 1940's scenario. In this scenario, a German pilot and an American pilot are flying adversarial combat missions against one another. Piloting the first operational jet-powered airplane, the German forces the American into escape maneuvers. Fortuitously returning from the engagement, the American reports to headquarters that he had encountered a UFO. He substantiates his position by stating that the high-speed object matches nothing he had been briefed on or taught to recognize. His account documents that the object had no propellers. He notes that engine-driven propellers are the only known method for sustaining aerial flight. The point is that insufficient information is available to the pilot for resolving identity. In contrast, identity of the propeller-less object quite likely would have been resolved as a jetpowered airplane had the encounter been experienced and reported by Sir Frank Whittle. Sir Frank is the Englishman knighted in 1948 for his invention of the jet engine.

That identification and resolution capability lags behind developed knowledge is exemplified by the first-jet-airplane scenario. This lag is substantiated by the 1908 Tunguska, Siberia explosion. Terrible destruction of the land, extraordinary human-tissue burns and widespread obliteration of wild life could not be explained at first. Knowledge gained years later from the 1945 Hiroshima explosion shed light on a myriad of puzzlements. Similarity of topographical destruction in the two events clinches conviction that the Tunguska blast came from a nuclear explosion aloft. Terrestrial nuclear-explosion knowledge, coming as it did 37 years later, inescapably pinpoints the source to one of extraterrestrial origin.

Though the Tunguska analysis is substantial and thorough some scientists, without cause, choose not to recognize the conclusions. By doing so, in effect they position themselves to promulgate their own party line. Substituting for years of painstaking investigation, an unsubstantiated allegation is made that the Tunguska event results from impact of a huge meteor. A meteor impact simply does not fit all known facts sufficiently well to render the allegation credible. This incongruent situation serves to focus attention on a possible need to interrogate vigorously perpetuated

explanations for certain aspects of the solar system and the universe. Repetitious publication tends to cause unqualified explanations to become accepted without challenge.

The role of science, starting with Copernicus and Galileo, has been to ascertain physical truth. This long-standing scientific approach should continue to be pursued. Pursuance of the approach may lead to devaluation of personal property, such as that represented by publications; but unfortunately, such abrogation is a hazard of the scientific process of correcting and updating understanding. More aeronautical history of the 1940's will serve to illustrate some lessons pertinent to advancing state-of-the-art in astronomy and aerospace science.

A theory exists which says that a physical body can never reach the speed of light because an infinite force is required. The same theoretical argument was made for airplanes relative to the speed of sound in the 1940's. Aerodynamic theory holds that for a finite wing inclined in an airstream, lift and drag approach infinity near the speed of sound. With drag infinitely large, "breaking-the-sound-barrier" theoretically is impossible because, again, an infinite force is required.

Despite a theoretical limit on the speed of flight in air, Frank Whittle believed that were sufficient finite force applied to an object, it would move faster than the speed of sound. Application of Sir Frank Whittle's jet engine to airplanes confirmed this belief. The same contention that Sir Frank made for exceeding the speed of sound also can be made for exceeding the speed of light. After all, the basic electromagnetic equations are identical to the aerodynamic equations, except for magnitude of the constants of proportionality. In this context, the speed of light simply is a reference speed analogous to, and greater in magnitude than, the speed of sound. Speed of light is very close to six orders of magnitude greater than the speed of sound under standard atmospheric conditions.

Considering the evidenced ultra-high nuclear technology, flight speeds for E.M.V.'s greater than the speed of light technically is a realistic expectation. Successful operational achievement is keyed fundamentally to development of a low-weight engine in relation to the propulsive force delivered. This

development is exactly the same one Sir Frank Whittle attained on behalf of supersonic flight. With supersonic flight as a comparable historical precedent, superlumenal flight definitely should be regarded as being within the domain of reality.

Potential reality of superlumenal flight permits ideas to be considered which heretofore have been excluded. For example, the universe is believed to contain much more mass than can be accounted for visually. A simple explanation might be that the "missing" mass has superlumenal speed and, therefore, cannot be seen. The situation can be considered analogous to an observer being unable to hear a supersonic airplane approaching. In this aerodynamic analogy, a mass indeed is present; but in terms of a sonic reference, the mass is "missing".

Presence of electromagnetic vehicles in the solar system introduces likelihood for analogous similarities in the universe. When an enlightened attitude is taken toward E.M.V.'s advancement of not only the Sciences but also the Arts and Humanities appears to be filled with new excitement.

PART V

SYNTHESIS

CHAPTER 12

The Status

Frontiers of knowledge are endless. While knowledge has carried the world far in generally favorable directions, only a short segment of the exciting frontiers has been explored. Electromagnetic vehicles, because of their huge size and powerful electrical capabilities, are in a far-out class of their own. Consequently, they must be regarded as an ultraforce which transcends race, creed, color, national boundaries and forms of government. Implicitly, Earth is granted conditions for sustenance of life by the grace of an identifiable superior power. Conversely, this same power has definite capability to reduce Earth suddenly to a barren waste land like the moon.

An emotion frequently expressed by astronauts on returning to Earth is a feeling that Earth is a very special place. Yet there are those who are willing to risk terminating Earth's special processes - processes which have taken billions of years to attain. The trend is dangerous and foolhardy.

Already an extraterrestrial nuclear explosion aloft has been demonstrated at Tunguska USSR, and perhaps again in 1979 near South Africa and Antarctica. That electromagnetic vehicles are real and awesome can be attested to by the author from a sighting experience backed up by photography and collaborative witnesses. The now confirmed presence of an extraterrestrial nuclear power poses a hazard never contemplated heretofore. Specifically, an extraterrestrial interloper could initiate a nuclear blast which might well be confused by concerned terrestrial nuclear powers for an adversative first strike. A nuclear exchange would ensue mistakenly, resulting in catastrophic destruction on Earth. The risk of nuclear exchange between terrestrial adversaries is escalated hazardously because of this unpredictable interloper capability. Unless nuclear warfare is abandoned, the task of preserving Earth and its inhabitants becomes enormously difficult technically besides being inordinately costly.

A concept which widely pervades the scientific literature is what might be termed "dogmatic Darwinism". This expression connotes single-minded

tenure to only the concept of evolution. Make no mistake, change and hence "evolution" has occurred and still is occurring. Electromagnetic vehicles have played, and continue to play a role in effecting change. Electromagnetic vehicles, however, also create. They create rings of different types and compositions. They create satellite surfaces, such as that of Iapetus. Is there any reason to think creation stops at this impressive level of achievement? Not at all Just around Saturn, there are fairly ideal chemical broths containing life-form building blocks. Dry-lightning strikes from electromagnetic vehicles should be able to initiate life-form chemical reactions. Hence it can be reasoned that the two concepts, evolution and creation, are both correct.

Although inanimate creation has been shown, animate creation has not. Extraterrestrial life forms have yet to be positively identified though their presence is implied. Owing to the strange character of electromagnetic vehicles, communicative language is likely to be obscure as well as subtle. Obviously, a data base needs to be developed which is oriented specifically toward pin-pointing extraterrestrial life.

The SETI (Search for ExtraTerrestrial Intelligence) land-basedreceiver project is a cognitive start in this direction. Monitoring equipment, however, is geared technologically to identify intelligence signals at the sophisticated human level. Hopefully, signals from higher-than-human-intelligence sources will neither bypass nor slip undetected through the selected filters.

Many excursions into space by the USA have been made with broad, exploratory flight objectives. Consequently, except for entertainment, the public has not been able to identify specific benefits from huge taxdollar expenditures for space flights. In turn, space programs then are criticized for diverting funds from allegedly needed humanistic projects. Reluctance to fund open-end space exploration is not likely to change. Critically needed is a space program designed especially to define functions served in the solar system by electromagnetic vehicles. Their role with respect to Earth and its populace should be given particular attention. For example, the source of terrestrial lightning should be understood physically rather than accepted piously as a fathomless property of Nature.

Electromagnetic vehicles most likely originate outside the solar system. Hence, new avenues of inquiry can be considered concerning observed phenomena in the universe. The universe is laden heavily with nuclear energy; and apparently some societal intelligence has mastered its application on a large scale. Accomplishments include massively large engines, controlled nuclear fusion, planetary-satellite surface modification, lengthy transmission of huge electrical currents, and immensely high-power electro-potential fields.

Large-scale events almost beyond comprehension are taking place in the universe. Saturn, its rings and moons, is a definite hub of activity within the solar system. Because Saturn is relatively close to Earth, this region is focally a good one to monitor. Adequate monitoring might prove difficult owing to the highly-charged and nuclear character of the environs. Further, a question is raised whether humans in proximity will be tolerated by electromagnetic vehicles. Past events, notably the Tunguska explosion and a collision of a large body with the sun, pose questions of serious concern to everyone. All in all, compelling reasons are present for outmoding war and re-directing all war-related effort toward the preservation of humanity.

CHAPTER 13

Epilogue

Telemetry from Voyager 2 on its outward journey through the solar system shows that planet Uranus has a number of rings. One of the published photographic transmissions indicates that the rings are formed mechanistically the same as for Saturn. The ring-makers even lie within the ring at about the same angle as the ones shown for Saturn. Interestingly too, the Uranus moon, Miranda, has a combination of geological land forms found separately on various moons of Saturn.

Unusual terrain forms include square corners, nestled circular grooves, parallel straight-line grooves, and regions evidencing former viscous flow. Craters still are being explained by meteor impacts; but unorthodox terrain patterns simply do not fit this time-worn theory! Neither do these patterns fit conventional geological concepts. In contrast, strange surface shapes and contours and recent modification thereof readily are explicable in terms of observed electromagnetic vehicle capabilities.

Presence of electromagnetic vehicles (E.M.V.'s) in the outer solar system forces attention on an extraordinary potential hazard of manned space flight not considered heretofore. E.M.V.'s can be expected to pose an extreme hazard to manned space flight in the vicinity of Saturn and Uranus, and probably even as near to Earth as Mars. Some pictures of Mars suggest visitations by E.M.V.'s The massive power of E.M.V.'s means neither that humans absolutely should forgo space flights, nor that a Mars landing should never be undertaken. However, known presence of E.M.V.'s serves a substantial warning to space travelers at least to stay their distance. Failure to heed this warning could result in catastrophe and emotional unpleasantness much worse than that which resulted from the explosion of space-shuttle Challenger.

As precursors to committing humans to remote space, the special jurisdiction claimed by E.M.V.'s should be ascertained. Meanwhile, all

nations of the world should unite to meet the challenges and opportunities that these prodigious forces present.

Appendix

Equating a "body having physically inherent mobile capability" to the term "vehicle" possibly may be considered as too abrupt a step in nomenclature development. The potential problem lay in various connotations for the word. Multiple connotations do not lead to a focused idea concerning what is meant.

To illustrate, an automobile has inherent mobile capability; and reference to an automobile as a vehicle is quite common. On the other hand for example, an ape also has inherent mobile capability; but reference to an ape as a vehicle is uncommon in the sense that an automobile is a vehicle. That the former is inanimate and the latter animate is not the intended distinction. The significant distinction is that an automobile does not occur directly in Nature, whereas an ape is regarded as a direct product of Nature.

For purpose of the subject matter, the term "vehicle" is meant to be something not occurring directly in Nature, but rather something occurring as a by-product of Nature. Early introduction of "vehicle" as a descriptor is considered by the author to be, at worst, premature but not an inaccurate usage.

The reason for the belief in descriptor accuracy is independent of the non-personal photographic evidence presented herein. In 1971, the author had the exciting experience of having sighted and photographed a mobile slender body fitting the specific properties of the two bodies shown later in Plates 5 and 6. This sighting at the time was experienced by the author's wife and daughter. Through binoculars, this body appeared to be large and incorporated fine aerodynamic features at the fore and aft exhaust ends. That is, the ends did not terminate squarely cut-off as would result when a pole is sawed in two.

Rather, the ends were rounded much the same as are cowls of jet engine intakes. Bulbar streamers were emitted from locations along the body. Control over these streamers was demonstrated by the modulation of their

activity, and also by introduction of additional streamers which moved with definite periodicity.

Drawing upon many years of aerospace experience, the author has no reservation about labeling the sighted body a vehicle. The numerous and unique properties of the sighted vehicle also are evident variously in the micro-photographs presented. Until more research is performed to demonstrate otherwise, the bodies discussed in Plate 3 and subsequently shall be considered vehicles rather than objects of Nature.

Bibliography*

Books

- David Morrison, Voyages to Saturn (NASA SP-451, U.S. Government Printing Office, Washington D.C. 1982).
- The Cambridge Encyclopaedia of Astronomy, Simon Mitton, Editor-in-Chief (Crown Publishers Inc., New York, 1981).
- Louis Bell, The Telescope (Dover Publications, Inc., New York, 1981).
- David Morrison, Voyage to Jupiter (NASA SP-439, U.S. Government Printing Office, Washington, D.C, 1980).
- Carl Sagan, Cosmos (Random House, New York, 1980).
- William J. Kaufman III, Galaxies and Quasars (W. J. Freeman and Company, San Francisco, 1979).
- Bevan M. French, The Moon Book (Penguin Books, New York, 1978).
- Lloyd Motz and Annetta Duveen, Essentials of Astronomy (Columbia University Press, New York, 1977).
- John Baxter and Thomas Atkins, The Fire Came By - The Riddle of the Great Siberian Explosion (Warner Books, New York, 1976).
- S. V. Dresvin, Physics and Technology of Low-Temperature Plasma (Moscow, USSR 1972. English translation published by Iowa State University Press, Ames, IA, 1977).
- Norman R. Bergrun, Tomorrow's Technology Today (Academy Press, Cupertino, CA, 1972).
- Robert L. Johnson, The Story of the Moon (Meredith Corporation, Chicago, 1969).
- Franklin Miller, Jr., College Physics (Harcourt, Brace and World, Inc., New York, 1967).
- Peter van de Kamp, Elements of Astro-mechanics (W. H. Freeman and Company, San Francisco, 1964).
- A. F. O'D. Alexander, The Planet Saturn - A History of Observations, Theory and Discovery (Dover Publications, Inc., New York, 1962).
- Arthur I. Berman, Astronautics - Fundamentals of Dynamical Astronomy and Space Flight (John Wiley and Sons, Inc., New York, 1961).

- George P. Sutton, Rocket Propulsion Elements (John Wiley and Sons, Inc., New York, 1956).
- Samuel Glasstone, Sourcebook on Atomic Energy (D. Van Nostrand Company, Inc., New York, 1950).
- H. Glauert, The Elements of Aerofoil and Airscrew Theory (Cambridge at the University Press, 1947).
- Sir Horace Lamb, Hydrodynamics (Dover Publications, New York, 1945).
- Elliot G. Reid, Applied Wing Theory (McGraw-Hill Book Company, Inc., New York,

Reference Books

- Information Please Almanac, Atlas and Yearbook, Edited by Ann Golenpaul (Information Please Almanac, New York, 1977).
- Funk and Wagnalls New Encyclopedia, Edited by Joseph L. Morse and William H. Hedelson. Vol. 8, Electricity, pp 423-439 (Funk and Wagnalls, Inc., New York, 1972).
- The World Almanac and Book of Facts, Edited by Luman H. Long (New York World-Telegram, New York, 1966).
- Handbook of Fluid Dynamics, Victor L. Streeter, Editor-in-Chief (McGraw-Hill Book Company, Inc., New York, 1961).
- Mechanical Engineers Handbook, 4th edition, Edited by Lionel S. Marks (McGraw-Hill Book Company Inc., 1941).
- Standard Handbook for Electrical Engineers, 7th edition, Archer E. Knowlton, Editor-in-Chief (McGraw-Hill Book Company, Inc., 1941).

Periodicals

- Science (The American Association for the Advancement of Sciences, Washington D.C.).
    - D. R. Davis et al., 'Saturn Ring Particles as Dynamic Ephemeral Bodies' (Vol. 224, No. 4650, 18 May 1984) pp 744-746.
    - H. A. Zebher and G. Leonard Tyler, 'Thickness of Saturn's Rings Inferred from Voyager 1 Observations of Microwave Scatter' (Vol. 223, No. 4634, 27 January 1984) pp 396 and 397.

- Eugene M. Rasmusson and John M. Wallace, 'Meteorological Aspects of the El Nino Southern Oscillation' (Vol. 222, No. 4629, 16 December 1983) pp 1195-1202.
- Richard A. Kerr, 'Neptune Ring Fades Again' (Vol. 222, No. 4621, 21 October 1983) p 311.
- Richard A. Kerr, 'Where Was the Moon Eons Ago?' (Vol. 221, No. 4616, 16 September 1983) p 1166.
- Roger Lewin, 'What Killed the Giant Mammals?' (Vol. 221, No. 4615, 9 September 1983) pp 1036-1037.
- D. D. Bogard and P. Johnson, 'Martian Gases in an Antarctic Meteorite?' (Vol. 221, No. 4611, 12 August 1983) pp 651-654.
- Philip H. Abelson, 'Large-Scale Extinctions' Vol. 220, No. 4592, 1 April 1983) P9.
- Richard A. Kerr, 'Orbital Variation - Ice Age Link Strengthened' (Vol. 219, No. 4582, 21 January 1983) pp 272-274.
- Jack J. Lissauer, 'Saturn's Rings' (Vol. 218, No. 4572, 5 November 1982) p 521.
- Carl Sagan, 'Extraterrestrial Intelligence: An International Petition' (Vol. 218, No. 4571, 29 October 1982) p 426.
- Richard A. Kerr, 'Planetary Rings Briefing: New Outer Rings for Saturn?: The F Ring Becomes a Little Less Baffling; Spokes, SKR and SED - A Connection.; The Uranian Rings Get Stranger and Stranger' (Vol. 218, No. 4569, 15 October 1982) pp 276-277.
- Richard A. Kerr, 'Planetary Rings Explained and Unexplained' (Vol. 218, No. 4568, 8 October 1982) pp 141-143.
- R. S. Westrum, 'Explaining Meteorites' (Vol. 217, No. 4563, 3 September 1982) p 884.
- Richard A. Kerr, 'Saturn Briefing: Caged Argon: A Clue to the Birth of Titan; Rings, Rings, What Makes the Rings? Lightning on Saturn or Ring Discharges? What Battered the Satellites of Saturn?' (Vol. 216, No. 4551, 11 June 1982) pp 1210-1211.
- R. Ganapathy, 'Evidence for a Major Meteor Impact on the Earth 34 Million Years Ago: Implications for Eocene Extinctions' (Vol. 216, No. 4548, 21 May 1982) pp 885-886.
- P. G. Kamoun et al., 'Comet Enke: Radar Detection of Nucleus' (Vol. 216, No. 4543, 16 April 1982) pp 293-295.

    - P. J. Michaels et al., 'Observations of a Comet on Collision Course with the Sun' (Vol. 215, No. 4536, 26 February 1982) Cover photograph and pp 1097-1102.
- Reports on Voyager 2 Flyby of Saturn (Vol. 215, No. 4532, 29 January 1982).
    - (1) E. C. Stone and F. D. Miner, 'Voyager 2 Encounter with the Saturnian System', pp 499-504.
    - (2) B. A. Smith et al., 'A New Look at the Saturnian System: The Voyager 2 Images', pp 504-537.
    - (3) A. L. Larse et al., 'Photopolarimetry from Voyager 2: Preliminary Results on Saturn, Titan and the Rings', pp 537-543.
    - (4) R. Hanel et al., 'Infrared Observations of the Saturnian System from Voyager 2', pp 544-548.
    - (5) B. R. Sandel et al., 'Extreme Ultraviolet Observations from the Voyager 2 Encounter with Saturn', pp 548-553.
    - (6) G. L. Tyler et al., 'Radio Science with Voyager 2 at Saturn: Atmosphere and Ionosphere and the Masses of Mimas, Tethys and Iapetus', pp 583-558.
    - (7) N. F. Ness et al., 'Magnetic Field Studies by Voyager 2: Preliminary Results at Saturn', pp 558-563.
    - (8) H. S. Bridge et al., 'Plasma Observations Near Saturn: Initial Results from Voyager 2' pp 563-570.
    - (9) S. M. Krimigis et al., 'Low-Energy Hot Plasma and Particles in Saturn's Magnetosphere', pp 571-577.
    - (10) R. E. Vogt et al., Energetic Charged Particles in Saturn's Magnetosphere: Voyager 2 Results', pp 577-582.
    - (11) J. W. Warwick et al., 'Planetary Radio Astronomy Observations from Voyager 2 Near Saturn', pp 582-587.
    - (12) F. L. Scarf et al., 'Voyager 2 Plasma Wave Observations at Saturn', pp 587-594.
- M. Mitchell Waldrop, 'The Puzzle That Is Saturn' (Vol. 213, No. 4514, 18 September 1981) pp 1347-1351.
- M. Mitchell Waldrop, 'Saturn Redux: The Voyager 2 Mission' (Vol. 213, No. 4513, 11 September 1981) pp 1236, 1237 and 1240.
- Phillip H. Abelson, 'Voyager Mission to Saturn' (Vol. 212, No. 4491, 10 April 1981) p 125.

- Reports on Voyager 1 Flyby of Saturn (Vol. 212, No. 4491. 10 April 1981).
  - (1) E. D. Miner, 'Voyager 1 Encounter with the Saturnian System', pp 159-162.
  - (2) B. A. Smith et al., 'Encounter with Saturn: Voyager 1 Imaging Science Results, pp 163-191.
  - (3) S. P. Synnott et al., 'Orbits of the Small Satellites of Saturn', pp. 191-192.
  - (4) R. Hanel et al., 'Infrared Observations of the Saturnian System from Voyager 1', pp 192-200.
  - (5) G. L. Tyler et al., 'Radio Science Investigations of the Saturn System with Voyager 1: Preliminary Results', pp 201-206.
  - (6) A. L. Broadfoot et al., 'Extreme Ultraviolet Observations from Voyager 1 Encounter with Saturn', pp 206-211.
  - (7) N. F. Ness et al., 'Magnetic Field Studies by Voyager 1: Preliminary Results at Saturn', pp 211-217.
  - (8) H. S. Bridge et al., 'Plasma Observations Near Saturn: Initial Results from Voyager 1', pp 217-224.
  - (9) S. M. Krimigis et al., 'Low-Energy Charged Particles in Saturn's Magnetosphere: Results from Voyager 1', pp 225-231.
  - (10) R. E. Vogt et al., 'Energetic Charged Particles in Saturn's Magnetosphere: Voyager 1 Results', pp 231-234.
  - (11) D. A. Gurnett et al., 'Plasma Waves Near Saturn: Initial Results from Voyager 1', pp 235-239.
  - (12) J. S. Warwick et al., 'Planetary Radio Astronomy Observations from Voyager 1 Near Saturn', pp 239-243.
- Eliot Marshall, 'Navy Lab Concludes the Vela (Satellite) Saw a (Nuclear) Bomb' (Vol. 209, No. 4460, 29 August 1980) pp 996-997.
- Reports on Pioneer Flyby of Saturn (Vol. 207, No. 4429, 25 January 1980).
  - (1) J. W. Dyer, 'Pioneer Saturn', pp 400-401.
  - (2) A. G Opp, 'Scientific Results from the Pioneer Saturn Encounter: Summary', pp 401-403.
  - (3) J. H. Wolfe et al., 'Preliminary Results on the Plasma Environment of Saturn from the Pioneer 11 Plasma Analyzer Experiment', pp 403-407.

    - (4) E. J. Smith et al., 'Saturn's Magnetic Field and Magnetosphere', pp 407-410.
    - (5) J. A. Simpson et al., 'Saturnian Trapped Radiation and Its Absorption by Satellites and Rings: The First Results from Pioneer 11, pp. 411-415.
    - (6) J. A. Van Allen et al., 'Saturn's Magnetosphere, Rings and Inner Satellites', pp 415-421.
    - (7) J. H. Trainer et al., 'Observations of Energetic Ions and Electrons in Saturn's Magnetosphere', pp 421-425.
    - (8) W. Fillins et al., 'Trapped Radiation Belts of Saturn: First Look', pp 425-431.
    - (9) D. L. Judge et al., 'Ultraviolet Photometer Observations of the Saturnian System', pp 431-434.
    - (10) T. Gehrels et al., 'Imaging Photopolarimeter on Pioneer Saturn', pp 434-439.
    - (11) A. P. Ingersoll et al., 'Pioneer Saturn Infrared Radiometer: Preliminary Results', pp 439-443.
    - (12) D. H. Humes et al., 'Impact of Saturn Ring Particles on Pioneer 11*. pp 443-444.
    - (13) M. H. Acuna and N. F. Ness, 'The Magnetic Field of Saturn: Pioneer 11 Observations', pp 444-446.
    - (14) A. J. Kliore et al., 'Vertical Structure of the Ionosphere and Upper Neutral Atmosphere of Saturn from Pioneer Radio Occulation', pp 446-449.
    - (15) J. D. Anderson et al., 'Pioneer Saturn Celestial Mechanics Experiment', pp 449-453.
- Richard A. Kerr, 'Rings Around the Solar System' (Vol. 206, No. 4414, 5 October 1979) pp 38-40.
- R. H. Thomas, 'West Antarctic Ice Sheet: Present-Day Thinning and Holocene Retreat of the Margins' (Vol. 205, No. 4412, 21 September 1979) pp 1257-1258.
- Astronomy (Astromedia, Kalmbach Publishing Co., Milwaukee, WI)
    - Richard Berry, 'Uranus: The Voyage Continues' (Vol. 14, No. 4, April 1986) p 10.
    - Edward J. Ciaccio, 'Atmospheres' (Vol. 12, No. 5, May 1984) pp 6-22.

    - Michael A. Sposito, 'A Conversation with Astronaut Joseph Allen' (Vol. 12, No. 4, April 1984) p 24.
    - Robert Burnham, 'IRAS and the Infrared Universe' (Vol. 12, No. 3, March 1984) pp 6-22.
    - Jeffrey K. Wagner, 'The Sources of Meteorites' (Vol. 12, No. 2, February 1984) pp 6-16.
    - Michael Carrol, 'A New Mission to Saturn' (Vol. 11, No. 12, December 1983) pp 6-15.
    - David Morrison, 'Return to the Planets: A Blueprint for the Future' (Vol. 11, No. 9, September 1983) pp 6-15.
    - Donald F. Robertson, 'Mystery Gap' (Vol. 11, No. 6, June 1983) pp 60-61.
    - David Swift, 'Voyager: Technological Totem' (Vol. 11, No. 1, January 1983) pp 24-26.
    - Jack R. Schendel, 'Looking Inside Quasars' (Vol. 10, No. 11, November 1982) pp 6-22.
    - Francis Reddy, 'Backtracking the Comets' (Vol. 10, No. 8, August 1982) pp 6-17.
    - Edward J. Ciaccio, 'Landscapes of the Solar System' (Vol. 10, No. 7, July 1982) pp 6-23.
    - Van Kane, 'The Little Big Missions' (Vol. 10, No. 5, May 1982) pp 16-17.
- The Planetary Report (The Planetary Society, Pasadena, CA.)
    - Jeffrey Taylor, 'Moon Rocks' (Vol. 4, No. 2, March/April 1984) pp 4-6.
    - Thomas R. McDonough, 'The Search for Extraterrestrial Intelligence (SETI)' (Vol. 3, No. 2, March/April 1983) p 3.
    - Paul Horwitz, 'Searching for Signals from Extraterrestrial Civilizations' (Vol. 3, No. 2, March/April 1983) pp 4-5.
    - Samuel Gulkis and John H. Wolfe, 'The NASA SETI Program' (Vol. 3, No. 2, March/April 1983) pp 6-7.
    - John Spencer, 'The Viking Legacy' (Vol. 11, No. 5, September/October 1982) pp 12-14.
    - Richard J. Terrille, 'Return to the Rings' (Vol. 1, No. 6, October/November 1981) pp 4-5.
    - Von R. Eshleman and G. L. Taylor, 'Radio Science at Saturn' (Vol. 1, No. 6 October/November 1981) pp 6-7.

    - Michael C. Malin, Ice Worlds' (Vol. 1, No. 4, June/July 1981) pp 8-10.
    - Dennis Matson, 'Gallery of the Moons' (Vol. 1, No. 2, February/March 1981) pp 6-7.
    - Jeffry Cuzzi, 'Saturn's Rings; A Voyager Update' (Vol. 1, No. 2, February/March 1981) pp 8-10.
    - David Morrison, 'The Mysteries of Saturn' (Vol. 1, No. 1, December 1980/January 1981) p 4.
- Sky and Telescope (Vol. 59, No. 4, April 1980).
    - 'Pioneer Saturn Pictorial', pp 292-293.
    - 'Saturn Sightings', p 296.
- Astronautics and Aeronautics, AIAA (Vol. 7, No. 1, January 1969).
    - Homer J. Stewart, 'Lunar Exploration-The First Decade Raises More Questions Than It Answers', pp 32-36.
    - Harold C. Urey, 'The Contending Moons', pp 37-41.
    - Harold Masursky, 'Lunar-Exploration Targets', pp 42-49.
    - Albert Hibbs, 'Surveyor Results', pp 50-63.
    - J. E. Conel, 'What the Rangers Revealed about Lunar Geology', pp 64-68.

Lectures

- Center for Space Science and Astrophysics
    - Peter Goldreich, 'The Dynamics of Planetary Rings' (7 November 1983), Physics Lecture Hall, Stanford University, California.
- American Institute of Aeronautics and Astronautics, (AIAA)
    - Astronaut Rusty Swiekert, 'Experiences in Orbital Flight' (10 May 1984), San Francisco Section, Sunnyvale, AIAA, California.

News Presentations

- Campus Report
    - Diana Diamond, 'Scientists Discover Saturn Rings To Be Amazingly Thin (Stanford University, California, 25 January 1984) p 1.

    - Joel Shurkin, 'Saturn's Rings Are Made of Red Ice, Says Latest Study' (Stanford University, California, 25 August 1982) p 7.
- The Stanford Daily
    - "El Nino" -The Century's Unequaled Natural Catastrophe' by the Los Angeles Times. (Stanford University, California, 19 August 1982) p 2.
- San Jose Mercury News
    - John Noble, New York Times, 'Scientists Baffled by Earth's Cycle of Extinction
    - Every 26 Million Years' (San Jose, California, 12 December 1983) p 8A.
- KQED-TV Channel 9 San Francisco
    - 'Voyager 2 at Saturn', 26 August 1981 (closest approach).
    - 'Voyager 1 at Saturn', 12 November 1980 (closest approach).

**This bibliography has been compiled in accordance with 'Hart's Rules for Compositors and Readers at the University Press, Oxford', thirty-eighth edition, completely revised 1978 at the Oxford University Press.*

List of Plates

1. Rings and spherical satellites of Saturn. Radius of Saturn is 60,330 km (37,490 mi).
    (a) Rings
    (b) Spherical satellites
2. Saturn, second largest planet in the solar system, exhibiting circularly complete rings.
3. A luminous source appears in the A-ring of Saturn.
4. Conceptualization of the incomplete A ring in a polar view of Saturn's northern hemisphere, using Earth as a comparable reference measure.
5. Efflux from along the length of a slender body, exhausting at both ends, generates the A-ring.
6. A slender vehicle forms an A-ring trail which includes a luminous source.
7. Formation of the Enke division.
8. A second vehicle substantiates the process by which the outer A-ring and the Enke division are formed.
9. Partially developed ring system exhibiting a transversely positioned cylindrical vehicle in the B-ring.
10. Emitting vehicle stationed outside the A-ring encompasses the F-ring location.
11. Saturn, five Saturnian moons and an unexpected luminous image.
12. Pictorialization of luminous image in positional relationship to Saturn, the A, B and E rings, six near moons and their orbital paths.
13. Enlargement of luminous image revealing a nearby slender vehicle within the E ring.
14. Sector of southern hemisphere of Saturn showing cloud strata, a luminous point, location of a lightning source and a slender vehicle. (Picture exposure has been made to favor dark region at planet horizon.)
15. Luminous point of plate 14 essentially is an arc light whose apparent power source is a remote vehicle capable of generating paths carrying electricity.
16. Two lightning bolts appear in and above Saturn's cloud tops. Photograph is an enlargement of plate 14 in the area labeled "lightning location".
17. A colorful, large-scale narrow-band disruption in Saturn's rings extending across the entire ring system.

18. Luminous sources provide clue to presence of electromagnetic vehicles as a causative mechanism for a filled Cassini gap and an apparent ring shift.
19. Vehicle and ejecta in the Cassini gap in relation to an A-ring discontinuity, an apparent ring shift and a luminous source.
20. Apparent ring shift and band discontinuity in relation to two electromagnetic vehicles in the Cassini gap.
21. Braided strands, a braiding unit and cross flow between discontinuity boundaries at the B-ring inner edge.
22. B-ring emissions become C-ring constituents.
23. Non-uniformly luminescent F ring in positional relationship to A-ring components and a shepherding satellite.
24. Segments of F-ring close-up showing that luminosity derives from emissively active core material.
    (a) Region (1), plate 23
    (b) Region (2), plate 23
25. Non-uniformly luminescent F-ring of plate 23 exposed to reveal inter-connections between the F-ring and A-ring outer edge.
26. Photograph of braided F-ring exposed to reveal a large coupled object.
27. Three fineness ratio 13 vehicles having multiple unit sizes of 1, 2 and 4 closely satisfy the planar dimensional requirements for forming the A, B, C and D Saturnian rings. View is perpendicular to the ring plane.
28. A simplified electromagnetic vehicle in different attitude angles for two positions during formation of the inner-Enke A ring.
29. A dark blue latitudinal stripe in Saturn's atmosphere emanates from an object identifiable as a probable electromagnetic vehicle component.
30. Salient features of an operational electromagnetic vehicle.
31. Front-end appearance of an electromagnetic vehicle as rendered from plate 30.
32. Luminescently active landscape on Dione.
33. Dione's narrow-band illuminated topography showing various types of emission.
34. Dione's narrow-band illuminated topography evidencing widespread emissive activity.
35. Macro-views of Dione showing curvi-linear surface markings and duality in surface lighting.
    (a) Photographic identifications
    (b) Pictorial identification aids

36. Macro-scopic composite view showing Dione amidst an impinging electromagnetic flow field.
37. Iapetus exhibiting dichotomous facial topography adjacent an active zone populated with circular and elongated light sources.
38. Composite photograph of Iapetus showing illumination by, and a peripheral linking to, an electromagnetic vehicle.
39. Micro-photographic montage showing Iapetus subjected to an electro-potential field created by an electromagnetic vehicle.
40. Electro-potential flow field for a conducting sphere located between bi-level voltage sources.
41. Network of electrical current and equi-potential paths calculated for a sphere in ideal flow.
42. Illustration of Iapetus constrained by the electro-potential field of an electromagnetic vehicle as rendered from plates 38 and 39.
43. Mare Orientale as portrayed on an official NASA moon globe.
44. Configuration interpretation of lunar markings at Mare Orientale utilizing an official NASA moon globe.
45. An electromagnetic vehicle and a NASA moon globe co-scaled and positioned to illustrate formation of Mare Orientale.

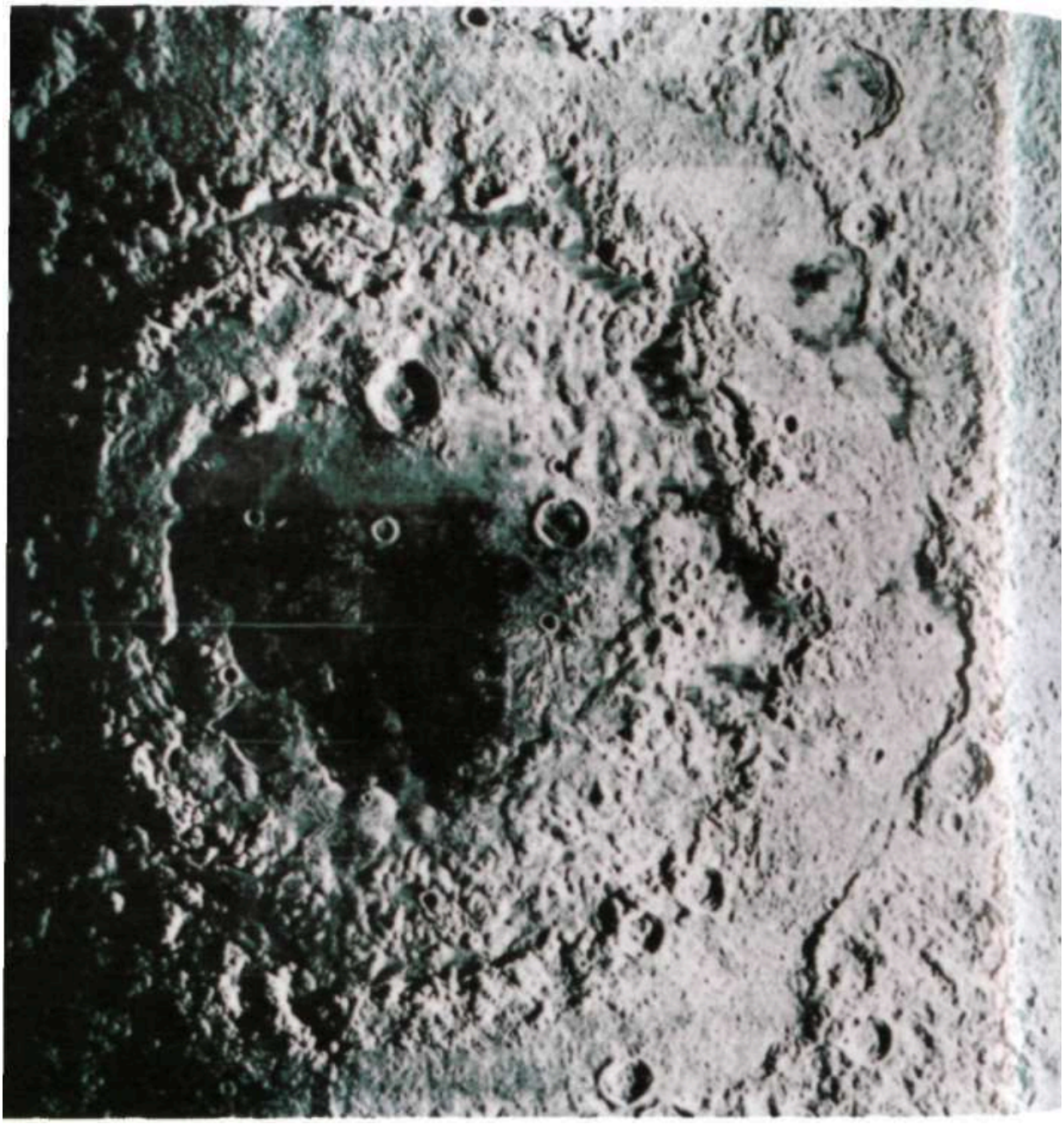


Plate 45: Mare Orientate, anciently imprinted on Earth's moon by an "E.M.V.", remains a demonstrative statement of awesome power. Photograph, which includes only part of the affected area, is a mosaic assembled by NASA from circumlunar flights.